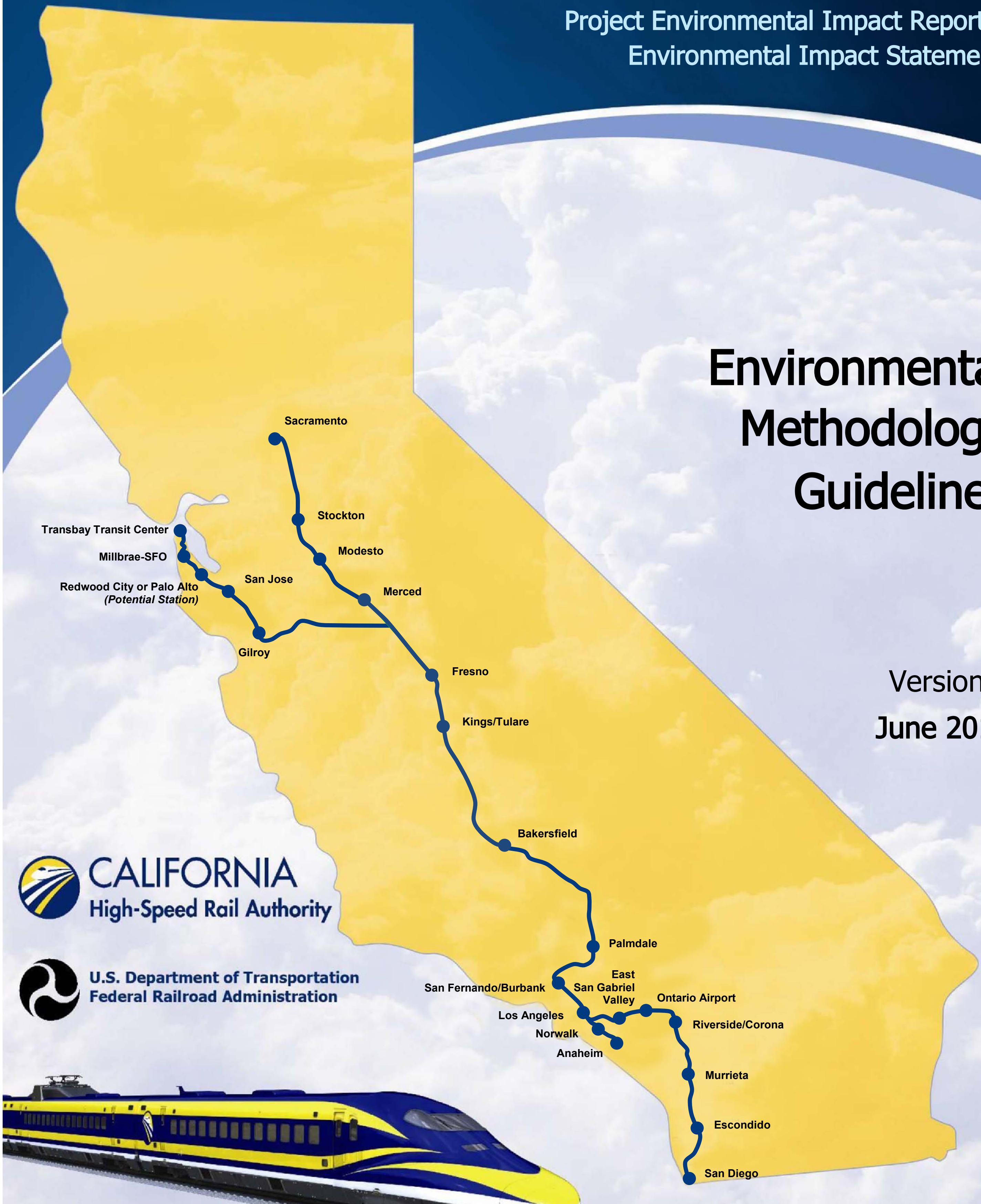
CALIFORNIA HIGH-SPEED RAIL

Project Environmental Impact Report /
Environmental Impact Statement



Environmental Methodology Guidelines

Version 5

June 2014

CALIFORNIA
High-Speed Rail Authority

U.S. Department of Transportation
Federal Railroad Administration

California High-Speed Rail Program

TECHNICAL GUIDANCE

CHSR Project EIR/EIS Environmental Methodology Guidelines, Version 5

Prepared by: ____________________ 6/27/14
David Shpak, PMT Environmental Manager — Date

Checked by: ____________________ 6/27/14
Bryan K. Porter, PMT Acting Environmental Program Manager — Date

Reviewed by: ____________________ 6/30/14
Scott Rothenberg, Authority Senior Environmental Planner — Date

Reviewed by: ____________________ 6/30/14
Mark A. McLoughlin, Authority Director of Environmental Services — Date

Approved by: Jeff Morales 7-3-14
Jeff Morales, Authority Chief Executive Officer — Date

Revision	Date	Description
0	Feb. '07	Initial Release
1	Feb. '08	PMT, Authority, FRA, and AG Comments Incorporated
2	Feb. '09	PMT, Authority, FRA, and AG Comments Incorporated
3	Apr. '09	PMT, Authority, FRA, and AG Comments Incorporated
4	Sep. '10	PMT, Authority, FRA, and AG Comments Incorporated
5	Jun. '14	PMT, Authority, FRA, and AG Comments Incorporated

Note: Signatures apply for the latest technical memorandum revision as noted above

Prepared by PARSONS BRINCKERHOFF

for the California High-Speed Rail Authority

Revision	Date	Description
5.01	Nov. '15	RDP, Authority, FRA Revision to Section 3.16, Aesthetics, and Visual Quality
5.02	Feb. '16	RDP, Authority Revisions to Section 3.3, Air Quality and Global Climate Change
5.03	May '16	RDP, Authority Revisions to Section 3.3 Air Quality and Global Climate Change, and to Section 3.6, Public Utilities and Energy
5.04	Jun. '16	Authority, FRA Revisions to Section 3.16, Aesthetics and Visual Quality
5.05	Jun. '16	Added V.5 Errata Sheet; Change all Chapter 3 Section Outlines to Substitute Subheading "Project Subsection" for "Project Segment"
5.06	Oct. '16	Authority & FRA Revisions to Section 3.17, Cultural Resources
5.07	Feb. '17	Authority Revisions to Section 3.18, Regional Growth; addition of Appendix F, Regional Growth Methodology Guidelines
5.08	Mar. '17	Authority Revisions to Section 3.18, Regional Growth, and to Section 3.11, Safety and Security
5.09	Apr. '17	Authority Revisions to Section 3.3, Air Quality and Global Climate Change, and Section 3.17, Cultural Resources; addition of Cultural Resources memoranda; and the addition of FRA Guidance on documenting NEPA conclusions.

Note: Signatures apply for the latest technical memorandum revision as noted above

Version 5 Errata Sheet

1. See document revision table at beginning of document.
2. All Chapter 3 section outlines are to refer to Project Subsection rather than Project Segment (change made June 2016).

BACKGROUND AND OVERVIEW FOR THE PROJECT EIR/EIS METHODOLOGY

Purpose

This guidance describes the methodology for conducting investigations and analyzing potential environmental and community impacts, preparing the content of a environmental impact report/ environmental impact statement (EIR/EIS), compiling and producing the EIR/EIS Volume 1 document and Volume 2 appendices for California high-speed rail (HSR) projects. The goal of the project EIR/EIS guidance is to ensure:

- Ease of comparison of the alternatives being evaluated for the reader
- Consistency in presentation—both among different EIR/EISs and internally within the EIR/EIS documents
- Completeness and accuracy of information presented
- Clear, understandable, and concise format and presentation

Each HSR project EIR/EIS that is released by the California High-Speed Rail Authority (Authority) and Federal Railroad Administration (FRA) must be an integrated and internally consistent document that is understandable by members of the public. The responsibility for preparing such a document resides with the HSR regional consultant (RC). The program management team (PMT) and Authority staff will provide guidance for preparation and an initial check of the document to ensure quality and adherence to approach, format, and methodology. Subsequent Authority, FRA (FRA program, environmental, and legal staff), and state legal (Attorney General, Authority staff and other counsel) reviews may occur in different ways throughout the process, but typically will focus on general, high-level evaluations related to presentation of alternatives, adequacy of analysis and conclusions, and compliance with applicable laws, regulations, and guidance.

A project environmental document provides more detail than a program environmental document. FRA's *Procedures for Considering Environmental Impacts* (64 FR 28545) states:

> *In preparing the site specific or component action documentation, the Program Office shall reference and summarize the programmatic document and shall limit the discussion to the unique alternatives and impacts of the site specific or component action.*

Under the California Environmental Quality Act (CEQA), the use of a project EIR enables the lead agency to:

> *…examine the environmental impacts of a specific development project. This type of EIR should focus primarily on the changes in the environment that would result from the development project. The EIR shall examine all phases of the project including planning, construction, and operation.*

These guidelines define the level of analysis and documentation to be undertaken for project-level HSR proposals. The methods for the project analysis build on work completed at the program level to further identify and describe impacts at a level of detail necessary for permits and approvals. The environmental analyses prepared using these methodology guidelines will inform lead agency decisions on specific alignment and station locations, mitigation commitments, and future regulatory and other approvals.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim

or with refinement, as appropriate, into applicable areas within the EIS/EIR. Example text that illustrates the concepts and methods is shown in *italics*. The methods follow the general sequence of content of the EIR/EIS and use the same format scheme for headings, text, and tables as the EIR/EIS. Specific outlines for EIR/EIS content are provided at the end of guidance for each chapter and each Chapter 3 section. The Authority's *Style and Branding Guide* provides detailed direction on requirements for all documents, including terminology, grammar, punctuation, style, official references, legal citations, logotype and color usage, fonts, and page layout.

Organization

These guidelines are organized in numerical order, by chapter and section. Chapters 1 and 2 provide guidance for preparing the purpose, need, and objectives and the description of alternatives to be evaluated in the EIR/EIS. Chapter 3 begins with general guidance applicable to all EIR/EIS resource sections followed by resource-specific guidance (Section 3.2 through Section 3.18). Section 3.19 provides the cumulative impact analysis methodology. Section 3.0 and Section 3.19 must be used in combination with the resource-specific guidance sections in Chapter 3 when developing the EIR/EIS analyses.

Chapters 4 and 5 provide guidance for preparing the Section 4(f) and Section 6(f) and Environmental Justice (EJ) evaluations (respectively). Chapters 6 through 12 incorporate information from the relevant EIR/EIS resource sections into their analyses. Chapters 13 and 15 define terms, acronyms, and abbreviations used throughout the guidelines. Chapter 14 is the index to content in Volume 1. Direction for preparing the Mitigation Monitoring and Enforcement Plan and additional resource materials are provided in five appendices to this guidance.

Guidance on content of EIR/EIS Volume 2 follows the Volume 1 guidance.

- The **Summary** provides guidance for preparing the overview of the HSR project environmental review, from the Tier 1 programmatic evaluations through the Tier 2 project-level evaluation contained in the EIR/EIS.
- **Chapter 1**, **Project Purpose, Need, and Objectives**, provides guidance for developing the background and the purpose, need, and objectives for the project.
- **Chapter 2**, **Alternatives**, provides guidance for preparing the description of the development, evaluation, and screening of the project alternatives and descriptions of the alternatives carried forward for evaluation in the EIR/EIS.
- **Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Measures,** presents the state and federal regulatory frameworks for analyzing and disclosing the potential environmental and community impacts of HSR projects, designing measures to mitigate potential significant impacts, and legal authority to implement off-site mitigation measures. Guidance for conducting outreach to local agencies integral to the content of Chapter 3 is also provided.
- **Chapter 3.0, General Methodology Guidance for Chapter 3 Resource Sections,** provides the methodological framework common to the evaluation of all resource areas. The components of the environmental resource study area and guidance for describing the affected environment; discussion of laws, regulations, and orders; regional and local policy analysis; environmental consequences; and mitigation measures applicable to all resource evaluations. This general guidance must be used in combination with the resource-specific guidance when preparing EIR/EIS resource sections.
- **Section 3.1, Introduction,** provides guidance for preparing this section of the EIR/EIS, which describes the purpose, approach, and content of Chapter 3. Example text and figures are included.

- **Section 3.2 through Section 3.18** provide guidance for preparing each of the specific EIR/EIS resource sections (see Section 3.0.12 for a list of sections) following the general order of information to be presented in each resource section. The resource-specific guidance, supplemented by the general methods provided in Section 3.0 and cumulative methods provided in Section 3.19, are essential for conducting the analysis.
- **Section 3.19, Cumulative Impacts,** provides guidance on identifying and assessing cumulative impacts for each resource. Each resource analyst will conduct the cumulative impact analysis based on this guidance for ultimate inclusion in Section 3.19 of the EIR/EIS rather than in the individual resource section.
- **Chapter 4, Section 4(f) and Section 6(f) Evaluations,** provides specific guidance for preparing this evaluation. It follows the general order of the EIR/EIS chapter using example text and tables to supplement the guidance.
- **Chapter 5, Environmental Justice,** provides specific guidance for evaluating potential project and cumulative impacts on EJ populations and conducting the outreach to EJ populations. It follows the general order of the EIR/EIS chapter using example text and tables to supplement the guidance.
- **Chapter 6, Project Costs and Operations**, provides guidance for documenting the estimated costs for building, operating, and maintaining the project. Content is based on the *Merced to Fresno Section Final EIR/EIS* (May 2012) and *Fresno to Bakersfield Section Final EIR/EIS* (April 2014).
- **Chapter 7, Other CEQA/NEPA Considerations**, provides guidance for describing the unavoidable adverse impacts, the relationship between short-term uses and long-term productivity, any irreversible or irretrievable commitments of resources.
- **Chapter 8, Preferred Alternative and Station Site(s)**, provides guidance for preparing the introduction and description of the Preferred Alternative and station locations, the environmentally superior alternative, and the least environmentally damaging practicable alternative. This chapter will be prepared by the RC upon completion of the public comment period and will be included in the final EIR/EIS. Though a preferred alternative will be selected and discussed, certain project components may not receive preference and the chapter should identify the components of which the Authority and FRA have deferred selection.
- **Chapter 9, Public and Agency Involvement**, provides guidance on presenting the Authority's and FRA's public and agency involvement activities.
- **Chapter 10, EIR/EIS Distribution**, provides guidance on identifying the agencies and parties that were informed on the availability of the environmental document and the repository locations where the environmental documents can be reviewed. The organization and structure of the listings is presented.
- **Chapter 11, List of Preparers**, provides guidance for summarizing the personnel with the Authority and the consulting firms primarily responsible for the preparation and review of the project-level environmental document.
- **Chapter 12, References/Sources Used in Document Preparation,** lists some of the standard references used in the HSR EIR/EIS documents and examples of various source types. Reference styles also are indicated.
- **Chapter 13, Glossary of Terms,** includes brief definitions of the terms used throughout the methods document. It is provided for use by the reviewing team.
- **Chapter 14, Index,** provides an example of the index from the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014).

- **Chapter 15, Acronyms and Abbreviations,** lists the acronyms and abbreviations used throughout the methods document.
- **Appendix A, Technical Guidance and Data Resources,** lists the guidance on design and operations, HSR station and station area planning, environmental analysis, regulatory permitting, right-of-way acquisition, and other aspects of the HSR program and projects that are relevant to analyses of potential project impacts and information presented in the EIR/EIS.
- **Appendix B, Environmental Resource Study Area Dimensions,** provides definitions for key terms and lists spatial and other factors for determining initial extents of investigations pertaining to resources and topics included in the EIR/EIS.
- **Appendix C, Cultural Resources Technical Materials,** provides detailed technical memoranda and other guidance for impact analyses and documentation of cultural resources.
- **Appendix D, Additional Resources,** provides informative, advisory materials prepared by technical experts in the environmental and allied professions.
- **Appendix E, Mitigation Monitoring and Enforcement Plan,** provides guidance on preparing the Mitigation Monitoring and Enforcement Plan for the EIR/EIS and the forms for entering data on mitigation measures and impact avoidance and minimization features into the Environmental Mitigation Management and Assessment program for the project.
- **Appendix F, Regional Growth Memo on Growth Estimates for Long-Term Employment and Population,** provides for a revised methodological approach for evaluating long-term employment and population.
- **Appendix G, FRA Memorandum on Documenting NEPA Conclusions**, provides guidance on interpreting and documenting NEPA impact conclusions.
- **Volume 2 Technical Appendices,** lists the appendices of detailed information that support and expand upon the content in Volume 1 of the EIR/EIS.

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Volume 1—Environmental Methodology Guidelines

Appendices

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SUMMARY

The Summary chapter provides a condensed version of the technical information discussed in the environmental impact report/environmental impact statement (EIR/EIS) and includes references to other sections of the document for additional detailed analysis and discussion. This environmental analysis guidance addresses the overall structure and content for the EIR/EIS Summary chapter.

The Summary of the EIR/EIS is the primary section that will be made available in languages other than English (where appropriate for the HSR section) and in format(s) to accommodate persons with disabilities. The Summary will be also be the section that will be most extensively distributed in printed hard copy in service of public and agency reviews, and lead agency decision making.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the chapter. Example text that illustrates the concepts and methods is shown in *italics*. The methods are organized to mirror the organization of the EIR/EIS chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

S.1 Introduction and Background

The California High-Speed Rail Authority (Authority), a state governing board formed in 1996, has responsibility for planning, designing, constructing, and operating the California High-Speed Rail (HSR). Its mandate is to develop a high-speed rail system that coordinates with the state's existing transportation network, which includes intercity rail and bus lines, regional commuter rail lines, urban rail and bus transit lines, highways, and airports.

High-Speed Rail System

The system that includes the HSR guideways, structures, stations, traction-powered substations, and maintenance facilities.

The California High-Speed Rail System (HSR System) will provide intercity, high-speed service on more than 800 miles of tracks throughout California connecting the major population centers of Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego. Figure S-1 shows this system. It will use state-of-the-art, electrically powered, high-speed, steel-wheel-on-steel-rail technology, including contemporary safety, signaling, and automated train-control systems, with trains capable of operating up to 220 miles per hour (mph) over a fully grade-separated, dedicated track alignment.

The Authority plans two phases. Phase 1[1] will connect San Francisco to Los Angeles/Anaheim via the Pacheco Pass and the Central Valley with a mandated express travel time of 2 hours and 40 minutes or less. Phase 2 will connect the Central Valley to the state's capital, Sacramento, and will extend the system from Los Angeles to San Diego.

Summarize the significance of the HSR section as a component of the statewide program. Insert a figure (such as the example shown in Figure S-2) of sufficient scale to contain the alternatives identified in the EIR/EIS. Identify the proposed location for stations and the section's beginning and ending points, or project termini. Summarize any components for which the Authority and FRA have deferred selection.

[1] Phase 1 would be built in stages dependent on funding availability.

Figure S-1 California HSR System initial study corridors (example only)

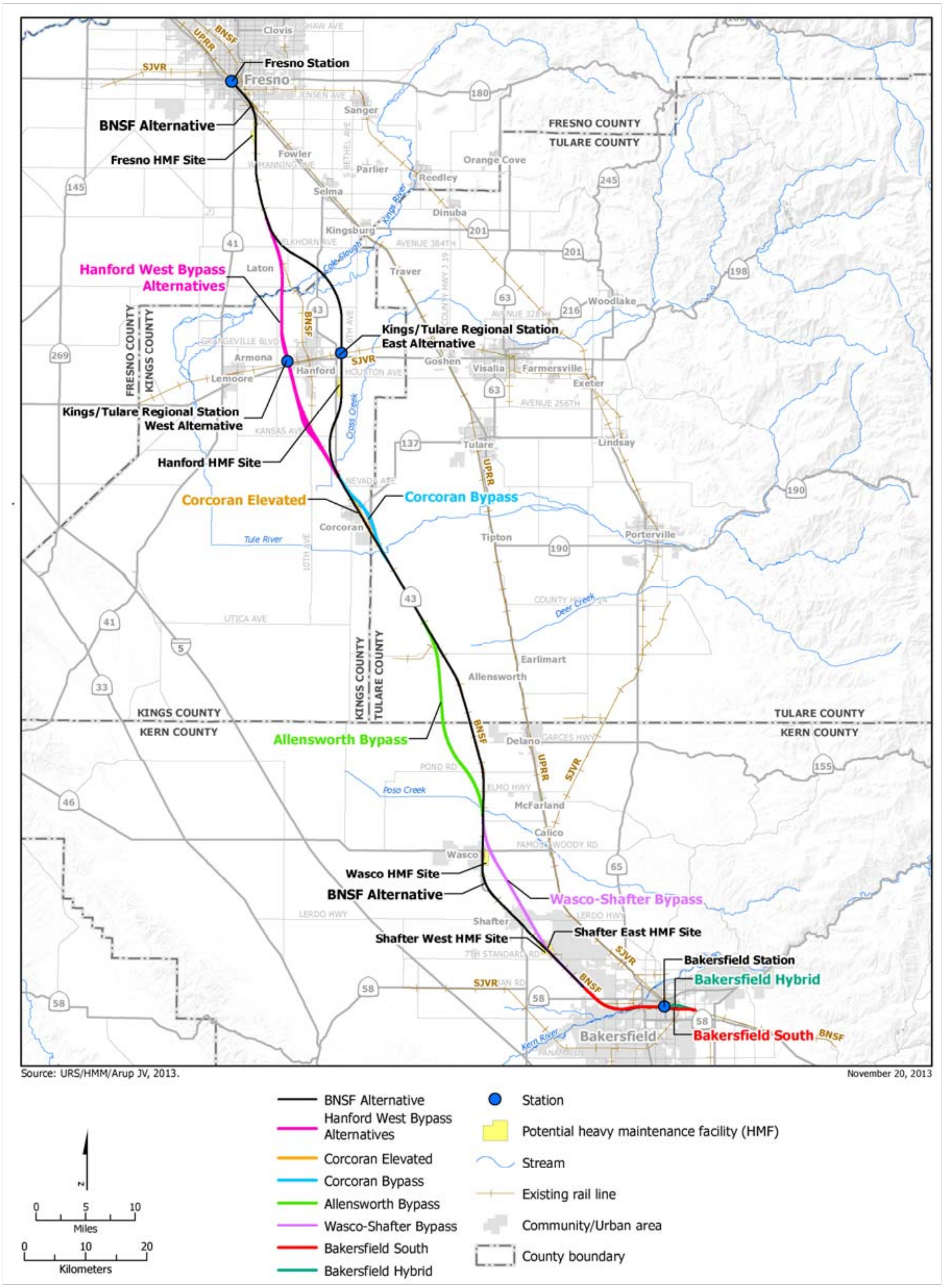


Figure S-2 Fresno to Bakersfield Section project alternatives (example only)

S.2 Tiered Environmental Review: Final Statewide Program EIR/EIS and [section name] Section Project EIR/EIS

The Council on Environmental Quality provides for National Environmental Policy Act (NEPA) (42 U.S.C. § 4321 et seq.) decision-making through a phased process. This process is referred to as *tiered* decision-making. This phased decision-making process for a broad-level programmatic decision at the first tier, with a first-tier EIS, to be followed by more specific decisions at the second-tier, with one or more second-tier EISs. The NEPA tiering process allows incremental decision-making for large projects that would be too extensive and cumbersome to analyze in a traditional project EIS. The California Environmental Quality Act (CEQA) (PRC 21000 et seq.) also encourages tiering and also provides for first-tier and second-tier EIRs.

The [section name] Section EIR/EIS is a second-tier EIR/EIS that tiers off two first-tier program EIR/EIS documents, and provides project-level information for decision-making on this portion of the HSR System. The Authority and the Federal Railroad Administration (FRA) prepared the 2005 *Final Program EIR/EIS for the Proposed California High-Speed Train System EIR/EIS* (Statewide Program EIR/EIS) (Authority and FRA 2005), which provided a first-tier analysis of the general effects of implementing the HSR System across two-thirds of the state. The 2008 *Bay Area to Central Valley HST Final Program EIR/EIS* (Bay Area to Central Valley Program EIR/EIS) (Authority and FRA 2008), and the Authority's 2012 *Bay Area to Central Valley HST Partially Revised Final Program EIR* (Authority 2012) , were also first-tier and programmatic but focused on the Bay Area to Central Valley region. These first-tier EIR/EIS documents provided the FRA and the Authority with the environmental analysis necessary for the evaluation of the overall HSR System and for making broad decisions about general high-speed train alignments and station locations for further study in the second-tier EIR/EISs. These documents are available on the Authority's website: www.hsr.ca.gov. The [section name] Section EIR/EIS analyzes the environmental impacts and benefits of implementing the high-speed rail in the more geographically limited area between [project areas] and is based on more detailed project planning and engineering. The analysis therefor builds on the earlier decisions and program EIR/EISs, and provides more site-specific and detailed analysis.

Summarize the list of any additional first tier environmental documents and the areas they evaluated. Summarize the list of second tier environmental documents approved to date. The following text from the *Fresno to Bakersfield Section Final EIR/EIS* may be adapted, as appropriate, for use in other HSR section documents.

For the California HSR System, including the [section name] Section, FRA is the lead federal agency for compliance with NEPA and other federal laws. The Authority is the project sponsor and joint-lead agency under NEPA, as well as the state lead agency under CEQA. There are two cooperating agencies included in the NEPA review process. The U.S. Army Corps of Engineers (USACE) agreed by letter, dated December 30, 2009, to participate as a cooperating agency under NEPA. The Surface Transportation Board (STB), by letter dated May 2, 2013, is also participating as a cooperating agency under NEPA.

Add any additional agency information related to cooperating agencies.

S.3 Issues Raised during the Scoping Process

Identify the dates of scoping meetings held in the HSR section corridor. List the number of workshops and their locations. List the number of participants and comments received. Identify the number of comments from individuals and from agencies. List the major issues identified during the scoping process and workshops.

S.4 Purpose of and Need for the HSR System and the [section name] Section

S.4.1 Purpose of the HSR System

The purpose of the California HSR System is to provide a reliable high-speed electric-powered train system that links the major metropolitan areas of the state and that delivers predictable and consistent travel times. A further objective is to provide an interface with commercial airports, mass transit, and the highway network and to relieve capacity constraints of the existing transportation system as increases in intercity travel demand in California occur, in a manner sensitive to and protective of California's unique natural resources.

S.4.2 Purpose of the [section name] Section

The purpose of this project is to implement the [section name] Section of the California HSR System to provide the public with electric-powered high-speed rail service that provides predictable and consistent travel times between major urban centers and connectivity to airports, mass transit, and the highway network in the [project area] and connects the northern and southern portions of the system.

S.4.3 Objectives and Policies for the HSR System in California and within the [project area] Part

The Authority has responded to its mandate to plan, build, and operate an HSR system that is coordinated with California's existing transportation network by adopting the following objectives and policies for the proposed HSR System:

- Provide intercity travel capacity to supplement critically over-used interstate highways and commercial airports
- Meet future intercity travel demand that will be unmet by present transportation systems and increase capacity for intercity mobility
- Maximize intermodal transportation opportunities by locating stations to connect with local transit systems, airports, and highways
- Improve the intercity travel experience for Californians by providing comfortable, safe, frequent, and reliable high-speed travel
- Provide a sustainable reduction in travel time between major urban centers
- Increase the efficiency of the intercity transportation system
- Maximize the use of existing transportation corridors and rights-of-way, to the extent feasible
- Develop a practical and economically viable transportation system that can be implemented in phases by 2030 and generate revenues in excess of operations and maintenance costs
- Provide intercity travel in a manner sensitive to and protective of the region's natural and agricultural resources and reduce emissions and vehicle miles traveled for intercity trips

The approximately [###]-mile-long [section name] Section is an essential part of the statewide HSR System.

Identify the regional location of the HSR section of the HSR System. Identify the jurisdictions the HSR section would serve and also reference the increased mobility throughout California. Reference Figure S-1.

S.4.4 Need for the HSR System Statewide and within the [project area]

The need for an HSR system exists statewide, with regional areas contributing to this need. The [section name] Section is an essential component of the statewide HSR System.

The capacity of California's intercity transportation system, including the [project area], is insufficient to meet existing and future travel demands, and the current and projected future congestion of the system will continue to result in deteriorating air quality, reduced reliability, and increased travel times. The current transportation system has not kept pace with the increase in population, economic activity, and tourism within the state. The interstate highway system, commercial airports, and conventional passenger rail system serving the intercity travel market are operating at or near capacity and will require large public investments for maintenance and expansion to meet existing demand and future growth over the next 25 years and beyond. Moreover, the feasibility of expanding many major highways and key airports is uncertain; some needed expansions might be impractical or are constrained by physical, political, and other factors. The need for improvements to intercity travel in California, including intercity travel between the southern San Joaquin Valley, the Bay Area, Sacramento, and Southern California, relates to the following issues:

Identify specific future growth demands for intercity travel within the HSR section region including any capacity constraints increasing congestion and travel delays, unreliability of travel that affects the quality of life and economic well-being of residents, businesses, and tourism in California, including the HSR section region, reduced mobility, poor and deteriorating air quality, and pressure on natural resources. Identify any other region-specific significant attributes when evaluating the need for the HSR system.

S.5 Alternatives

A summary of the alternatives should be prepared by the HSR Regional Consultant (RC). Incorporate this summary of alternatives into the EIR/EIS Summary chapter. Introduce the alternatives evaluated in the HSR section EIR/EIS Chapter 2, Alternatives, and identify the 2008 Statewide Program EIR/EIS, any other regional first-tier EIR/EIS, public and agency input from the scoping process, local and agency involvement during the Technical Working Group meetings, and other stakeholder meetings as providing input to the Authority's development of the alternatives. For the Final HSR section EIR/EIS, include public and agency comments on the Draft EIR/EIS as providing input to the Authority's development of the alternatives.

All components of the alternatives have been evaluated during an alternatives analysis screening process, which considered the effects of the alternatives on the social, natural, and built environment.

Begin the following subsection with the No Project Alternative, followed by the alignment alternatives and station area development.

S.5.1 No Project Alternative

Review Chapter 2, Alternatives, of the HSR section EIR/EIS and briefly summarize the findings.

The No Project Alternative is the basis for comparison of the project alternatives. The No Project Alternative represents the state's transportation system (highway, air, bus, conventional rail) as it is currently and as it would be after implementation of programs or projects that are currently projected in regional transportation plans, which have identified funds for implementation and are expected to be in place by 2035, as well as any major planned land use changes.

Identify the regional growth projection for the HSR section.

S.5.2 [section name] Section High-Speed Rail Alternatives

Identify and name the number of alternatives evaluated in the EIR/EIS. Reference Figure S-2 and insert figures specific to the alternatives. Summarize the similar features between the alternatives and then summarize the variations.

S.5.3 Station Area Development

Identify the station area sites evaluated in the EIR/EIS, referencing Figure S-2. Summarize the process of developing the alternate sites. Summarize the similar features between the sites and then summarize the variations.

S.5.4 Heavy Maintenance Facility (if applicable)

Describe the location and functions of the HMF.

S.6 Design Considerations to Avoid and Minimize Impacts

Present in tabular format the common project design and construction features that are incorporated in the HSR build alternatives to avoid or minimize environmental and community impacts. Organize the features by resource area or topic, as shown in the example Table S-1.

Table S-1 HSR Impact Avoidance and Minimization Features (example only)

Impact	Impact Avoidance or Minimization Features	CEQA Level of Significance after Mitigation
TRANSPORTATION		
Construction Impacts		
Traffic impacts of heavy construction vehicles on local streets.	Construction Truck Routes—Deliver all construction-related equipment and materials on the appropriate truck routes. Prohibit heavy-construction vehicles from accessing the site via other routes.	Less than significant.
Operations Impacts		
Local roadway congestion in HSR station areas	Implement traffic signal upgrades at intersections affected by station area ingress and egress trips	Less than significant

The Authority and FRA have committed to integrate programmatic impact avoidance and minimization measures consistent with the (1) 2005 Statewide Program EIR/EIS, (2) 2008 Bay Area to Central Valley Program EIR/EIS, and (3) 2012 Partially Revised Final Program EIR into the HSR project. Table S-1 provides the inventory of the measures that are considered to be part of all build alternatives. The Authority and FRA will implement these features during project design and construction, as relevant to the HSR project section, by:

- Following existing transportation corridors to the extent feasible
- Spanning water crossings where practical
- Using shared right-of-way when feasible
- Including passages for wildlife movement
- Including narrowed footprint with elevated or retained cut profile
- Avoiding sensitive environmental resources to the extent practical

S.7 No Project Alternative Impacts

Review the summaries prepared by the Regional Consultant (RC) resource section leads for the specific resource topics. Summarize the regional area growth, population, housing, and employment projections, as detailed in Chapter 2, Alternatives. Summarize the effects these projections would have on the area and resources in the area. For the No Project Alternative

subsection, summarize the greatest environmental impacts resulting from the No Project Alternative in the study area over the planning period. Support these statements based on the summaries prepared by the resource leads.

S.8 HSR Alternatives Evaluation

The following section provides an overview of the impacts, including benefits common to all HSR alternatives and proposed mitigation, and compares differences between the impacts and costs of the [###] alternative alignments and the HMF alternatives (if applicable). Table S-2 provides a high-level comparison of key design features associated with each of the alternative alignments being carried forward. This section then presents discussions of the impacts that differentiate the alternatives (and proposed mitigation measures), and the HMF alternatives (if applicable), as well as cost estimates for each alternative.

Table S-2 is an example derived from the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014).

Organize the alternatives impact discussion by:

- HSR benefits
- Adverse effects common to all HSR alternatives (by resource topic)
- Comparison of HSR alternatives

Table S-2 Design Features of Alternatives Carried Forward (example only)

Design Option	BNSF	Corcoran Bypass[1]	Allensworth Bypass[1]	Wasco-Shafter Bypass[1]	Bakersfield Hybrid[1]
Total length[2] (linear miles)	117	10(10)	21(21)	21(22)	12(12)
At-grade profile[2] (linear miles)	87	6(5)	18(19)	18(15)	3(3)
Elevated profile[2] (linear miles) (including retained fill)	30	4(5)	3(2)	3(7)	9(9)

[1] For comparison, equivalent numbers for the corresponding segment of the BNSF Alternative are presented in parenthesis.
[2] Lengths shown are based on equivalent dual-track alignments. For example, the length of single-track elevated structure will be divided by a factor of 2 to convert to dual-track equivalents.

S.8.1 HSR Benefits

State the number of anticipated daily riders boarding at the station(s) in the HSR section. Identify the percentage of riders who would have used automobiles to reach their destinations. Summarize how ridership in the HSR section would benefit the area, region, and state. Use actual percentages to show decreases in consumption and use of resources. For transit, use vehicle miles traveled and the corresponding reduction in emissions.

Compare the benefits of the HSR section against the No Project Alternative impacts.

Include a statement at the end of the subsection listing the negligible impacts of the project on specific resources.

Analysis of the HSR alternatives has determined that by applying required federal and state regulations and engineering standards, the construction and operation of the project would have impacts of negligible intensity on [insert applicable environmental resource topics].

S.8.2 Adverse Effects Common to All HSR Alternatives

Summarize significant impacts common to all HSR Alternatives in tabular form by environmental resource topic. List the environmental resource topics by the order in which they appear in the EIR/EIS.

The following potentially significant impacts would occur with all HSR alternatives. The impact analysis takes into account project design features, impact avoidance and minimization features, and the implementation of regulatory requirements to avoid or reduce impacts from implementing the project prior to application of mitigation measures.

Tables S-3 and S-4 show the differences among the alternatives, along with the associated mitigation measures for these impacts.

S.8.3 Comparison of HSR Alignment Alternatives

Summarize the main differences between the alternatives and station(s). Create tables to compare the alignment alternatives. Order the environmental resource consistent with the EIR/EIS and identify impacts by construction and then by operation (i.e., project).

The [insert name] Alternative is a single continuous alignment from [identify beginning and end points]. The additional [###] alternative alignments considered in this Project EIR/EIS deviate from the [insert name] Alternative [describe how they deviate]. There are [###] possible combinations of these alternatives to make a continuous alignment from [identify beginning and end points].

Table S-3 lists those impacts that differentiate each of the [###] project alignment alternatives. There are other environmental impacts associated with the alignment alternatives that are not listed in Table S-3 because they are of similar magnitude among the alternatives and therefore do not provide a means of differentiating between alternatives. Table S-4 lists all significant project impacts and proposed mitigation measures for the alternatives.

Many regulations require standard measures to avoid and minimize environmental impacts. The Authority will comply with these regulations, and therefore these measures are not summarized here. Table S-3 presents all of the mitigation measures proposed for the project. In addition, the Authority will strive to avoid and minimize impacts further as design progresses to final plans and specifications for construction.

Tables S-3 and S-4 are examples derived from the *Merced to Fresno Section Project Final EIR/EIS* (May 2012).

The [###] base alternatives that deviate from the [insert name] Alternative were developed to reduce the environmental impacts of the HSR project. The principal benefits and impacts of these alternatives relative to the [insert name] Alternative are discussed below.

Summarize the benefits and impacts alternatives evaluated in the EIR/EIS to reduce the environmental impacts of the HSR project.

S.8.4 Comparison of HSR Stations

Summarize the station locations analyzed in the project EIR/EIS. Summarize impacts for the station alternatives by first detailing the similar or common impacts and then station-specific impacts.

S.8.5 Comparison of HMF Alternative Sites (if applicable)

Identify the number of HMF sites evaluated along the [section name] Section. Create a table to compare the impacts at the HMF sites.

S.8.6 Capital and Operations Costs

Summarize any assumptions or rationale for capital costs associated with each alternative. Create a table to show the project costs (not including HMF) for each alternative.

Table S-3 Impacts that Differentiate North-South HSR Alternatives and Design Options (example only)

North-South Alignment Isolated and with Wye Design Option	HSR Alternatives and Design Options							
	UPRR/SR 99 Alternative		Hybrid Alternative		BNSF Alternative			
					Mariposa Way Design Options		Mission Ave Design Options	
	East Chowchilla Design Option	West Chowchilla Design Option	East Chowchilla Design Option	West Chowchilla Design Option	Le Grand	East of Le Grand	Le Grand	East of Le Grand
TRANSPORTATION								
Construction Impacts — No differentiating significant construction-period impacts between alternatives								
Operations Impacts								
Permanent Road Closures								
North-South Alignment	9	18	18	31	25	16	20	15
With Ave 24 Wye	19	28	NA	36	42	33	37	32
With Ave 21 Wye	21	NA	30	NA	38	29	33	28
AIR QUALITY AND GLOBAL CLIMATE CHANGE								
Construction Impacts								
Construction-related Pollutant Emissions								
North-South Alignment	Greatest amount of construction-related pollutants		Smallest amount of construction-related pollutants		Construction-related pollutants between UPRR and Hybrid			
With Ave 24 Wye								
With Ave 21 Wye								
Operations Impacts – No differentiating significant operations impacts between alternatives								

Table S-4 Comparison of Potential Adverse Effects of HSR Alternatives (example only)

Impact	HSR Alternatives			Mitigation Measure	CEQA Level of Significance after Mitigation
	UPRR/ SR 99	BNSF	Hybrid		
TRANSPORTATION					
Construction Impacts – None					
Operations Impacts					
TR#1: Permanent road closures.	19 to 28	28 to 42	30 to 36	TR-MM#1: Access maintenance for property owners.	Less than significant
TR#2: Existing plus Project Fresno Area between Herndon Avenue and Shaw Avenue intersection impacts.	X	X	X	TR-MM#4, TR-MM#7, TR-MM#8,: These mitigation measures propose to improve intersections, traffic lights, and lane movement.	Less than significant

S.9 Section 4(f)/Section 6(f)

Section 4(f)

Under Section 4(f) of the U.S. Department of Transportation Act (codified at 49 U.S.C. § 303), an operating administration of the U.S. Department of Transportation may not approve a project that uses properties protected under this section of the law unless there are no prudent or feasible alternatives and the project includes all possible planning to minimize harm to such properties. Properties protected under Section 4(f) are publicly owned lands of a park, recreation area, or wildlife and waterfowl refuge or land of a historical site (publicly or privately owned) of national, state, or local significance as determined by the federal, state, regional, or local officials having jurisdiction over the resource.

Review the summary of Section 4(f) impacts. Summarize the Section 4(f) resources in the HSR section project area and how the Section 4(f) resource(s) would be used. Identify the alternatives that would avoid the resource(s). Summarize all coordination or determinations made about the impacted resources. Summarize all measures to mitigate the potential impacts.

For the HSR section Final EIR/EIS, summarize the Section 4(f) Evaluation determination and identify the alternative with the lowest overall impact on Section 4(f) resources.

S.10 Section 6(f)

Section 6(f) properties are recreation resources funded by the Land and Water Conservation Fund Act (LWCF) Act. These properties also cannot be used for transportation projects unless there is no prudent or feasible alternative, and their use must be fully mitigated to the satisfaction of the National Park Service and the local jurisdiction administering the recreation resource.

Review the summary of Section 6(f) impacts. Summarize the Section 6(f) resources in the HSR section project area and how the Section 6(f) resource(s) would be used. Identify alternatives that would avoid the resource(s). Summarize any measures to mitigate the potential impacts.

S.11 Environmental Justice

The following laws and regulations govern environmental justice (EJ)-related issues:

- Title VI of the Civil Rights Act (Public Law 88-352); Presidential Executive Order (USEO) 12898, known as the Federal Environmental Justice Policy and the Presidential Memorandum accompanying USEO 12898
- Improving Access to Services for Persons with Limited English Proficiency (USEO 13166)
- U.S. Department of Transportation Order 5610.2(a), which updates the original Environmental Justice Order
- The Council on Environmental Quality's Environmental Justice Guidance under NEPA (CEQ 1997)
- Americans with Disabilities Act (42 U.S.C. § 12101 et seq.)
- Uniform Relocation Assistance and Real Property Program (42 U.S.C. § 4601 et seq.)
- California Government Code Section 65040.12(e)
- California Global Warming Solutions Act of 2006: Greenhouse Gas Reduction Fund (Assembly Bill32, Chapter 488, Statutes of 2006)

Additionally, the Authority's Title VI policy and plan and a Limited English Proficiency policy and plan address the Authority's commitment to non-discrimination on basis of race, color, national origin, age, sex, or disability and commitment to provide language assistance to individuals with limited English proficiency.

Based on the EJ resource lead's summary for Chapter 5, Environmental Justice, summarize the HSR section's impact on environmental justice populations and any mitigation to lessen potential impacts.

S.12 Areas of Controversy

Summarize the common areas of controversy for the HSR section project.

Based on the scoping meetings and public outreach efforts throughout the environmental review process, the following are known areas of controversy:

- [list areas of controversy]

S.13 Environmental Process (see language specific to the Draft and Final EIR/EIS)

Draft EIR/EIS Language

The Authority and FRA are circulating the Draft EIR/EIS to affected local jurisdictions, state and federal agencies, tribes, community organizations, other interest groups, interested individuals, and the public. The document also is available at the Authority offices, public libraries in the study area, and on the Authority's website. The following discussion outlines the next steps in the environmental process, from public and agency comment on the Draft EIR/EIS to construction and operation.

Final EIR/EIS Language

For the Final EIR/EIS, complete information about the dates of the comment period and the number and location of public hearings or agency meetings, and provide a reference to the location of this information in the Final EIR/EIS document. Identify the location of electronic and

hard copies of the Final EIR/EIR. Describe any public workshops held during circulation of the Draft EIR/EIS.

Copies were sent to cooperating federal agencies, state responsible and trustee agencies (including copies sent through the State Clearinghouse), and were available at the Authority's office in Sacramento.

S.13.1 Public and Agency Comment

Review Chapter 9, Public and Agency Involvement, and summarize the number and nature of comments received.

Draft EIR/EIS Language

The Draft EIR/EIS will be circulated for a 60-day comment period, which will include public hearings. Information about the schedule of public hearings is available on the Authority's website at www.hsr.ca.gov.

Final EIR/EIS Language

Summarize the number and nature of comments received for the HSR section. The following example text from the Fresno to Bakersfield Section final EIR/EIS can be used to develop this summary.

> *During the comment periods for the draft environmental documents, there were 1,472 comment submittals on the Fresno to Bakersfield Section Draft EIR/EIS, and 783 comment submittals on the Revised Draft EIR/Supplemental Draft EIS. The comments covered a wide range of issues and represented viewpoints from government agencies, organizations, business groups, businesses, residents, and property owners.*
>
> *Of the 2,255 submittals, 124 generally supported the project and 630 were generally opposed. The other submissions did not specifically state a preference for or against the project. Most comments came from individuals in the general public, living, working, or having property interests in the project study area. Most comments from the public in Kings County indicated that individuals did not want an HSR alignment that crossed their county, preferring that the HSR be located adjacent to SR 99 and the UPRR or adjacent to I-5. Many members of the public in Kern County requested that the HSR alignment avoid Downtown Bakersfield and be located on the outskirts of the city. Commenters from every county crossed by the Fresno to Bakersfield Section expressed interest in the project and looked forward to the additional transportation mode it would provide them, as well as the additional jobs it would bring the region.*
>
> *Among comments received from the general public, effects on community resources and agricultural and private property were the top concerns about the project. Also, comments expressed concern over the project cost estimates, funding availability (including whether any money should be spent on this type of project in light of state and federal budget deficits), and questions regarding the accuracy of the ridership projections. Common issues also covered safety, noise and vibration, ecosystem effects, neighborhoods, and construction effects.*
>
> *Affected jurisdictions generally listed their preferences in their comment submittals. The City of Fresno and Fresno County supported the project on the alignment selected through Fresno County. Kings County and the City of Hanford were opposed to an alignment that crosses Kings County. The City of Corcoran does not specifically support any of the three alternatives in or around Corcoran but believes that the alternatives that cross through town would have greater*

impacts than the Corcoran Bypass Alternative. The City of Shafter supports the BNSF Alternative through Wasco and Shafter and indicated a preference for below-grade crossings for freight at three roads. The City of Shafter also indicates that the Wasco-Shafter Bypass would result in substantial impacts on agricultural operations important to Shafter's economy as well as impacting the City's multimodal freight terminal. The City of Wasco has stated that an alternative through the city must be located on the east side of the BNSF Railway to avoid major impacts on Wasco's economy. The Authority is working with Wasco on mitigation for project impacts to the city. The City of Bakersfield Economic and Community Development Department expressed their interest in an alignment and station on the outskirts of the city. Regional, state, and Federal agencies generally confined their comments to concerns about their resources and the pertinent analysis. This included the U.S. Environmental Protection Agency (USEPA) and USACE. Businesses generally commented on specific property impact issues. Comments were received from 50 special-interest or community organizations representing their environmental or farming interests, the largest of which was Citizens for California High-Speed Rail Accountability.

S.13.2 **Identification of Preferred Alternative** (Draft EIR/EIS only)

After considering public and agency comments, the Authority and FRA will identify a preferred alignment alternative and site for each station. The Authority and FRA will prepare a [section name] Section Final EIR/EIS that will include responses to comments and a description of the preferred alternative and proposed mitigation.

S.13.3 **Identification of Preferred Alternative** (Final EIR/EIS only)

Summarize the preferred alternative alignment for the HSR section. Briefly summarize the rationale for this selection.

S.13.4 **Station Site(s)** (Final EIR/EIS only)

Summarize the preferred station location(s) for the HSR section. Briefly summarize the rationale for this selection.

S.14 **Summary of Changes between Draft and Final EIR/EIS** (Final EIR/EIS only)

Summarize the changes made to the EIR/EIS from the Draft to Final version by section. Organize the list in the order in which topics are presented in the EIR/EIS.

S.15 Next Steps in the Environmental Process

Summarize the proceeding activities in the joint CEQA/NEPA process, as appropriate for the Draft EIR/EIS and then the Final EIR/EIS. Describe the action(s) taken by lead and cooperating agencies at the level of detail indicated in the following boilerplate text from the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014). Provide action summaries for all cooperating agencies associated with the HSR section, which may also include the Federal Transit Administration (e.g., in the San Francisco to San Jose Section), U.S. Bureau of Land Management or U.S. Forest Service (e.g., in the Palmdale to Los Angeles Section).

Draft EIR/EIS Language

The Authority and FRA are circulating the Draft EIR/EIS to affected local jurisdictions, state and federal agencies, tribes, community organizations, other interest groups, interested individuals, and the public. The document also is available at the Authority offices, public libraries in the study area, and on the Authority's website. The following discussion outlines the next steps in the

environmental process, from public and agency comment on the Draft EIR/EIS to construction and operation.

Final EIR/EIS Language

Notices of availability of the Final EIR/EIS were published, and the document was distributed and made available to agencies and the public on [month day, year]. Before the Authority and FRA make decisions regarding the project, CEQA and NEPA require that each lead agency make specific findings and determinations regarding the project alternatives, potential impacts, mitigation measures, and conformance with specific environmental laws. Using these findings and determinations, and considering the entire Administrative Record that includes comments received on the Final EIR/EIS, the Authority will prepare a CEQA decision document and FRA will prepare a NEPA decision document approving the completion of the environmental review process and selecting the project alternative to be implemented. In making its decision, the Authority Board will consider whether to certify the Final EIR/ EIS, decide whether to approve the project, make the related Decision, and issue the Notice of Determination. FRA will make its decision through a Record of Decision (ROD).

S.15.1 Federal Railroad Administration Decision Making

Upon completion of the environmental process with publication of the [section name] Section Final EIR/EIS, the FRA expects to issue a ROD for compliance with NEPA. The ROD will describe the project and alternatives considered, describe the selected alternative, and identify the environmentally preferable alternative; make environmental findings and determinations with regard to air quality conformity, Endangered Species Act, Section 106, Section 4(f), and environmental justice; and require mitigation measures.

S.15.2 U.S. Army Corps of Engineers Decision-Making (if applicable)

The [section name] Section of the HSR System will require a permit from USACE under Section 404 of the Clean Water Act (33 U.S.C. § 1251 et seq.) and Section 14 of the Rivers and Harbors Act (33 U.S.C. § 408). USACE is using the [section name] Section EIR/EIS to integrate the procedural and substantive requirements of NEPA and its permitting responsibilities (including EPA's 404(b)(1) Guidelines) to provide a single document that streamlines and enables informed decision-making by USACE, including but not limited to, adoption of the EIS, issuance of necessary RODs, Section 404 permit decisions, and Section 408 permit decisions (as applicable) for alteration/modification of completed federal flood risk management facilities and any associated operation and maintenance, and real estate permissions or instruments (as applicable).

S.15.3 Surface Transportation Board

On completion of the environmental process and issuance of a ROD by the FRA, STB will issue a final decision on whether to approve the proposed project (the final decision also serves as the STB's ROD under NEPA). In making its final decision, the STB will consider the transportation merits, environmental record, and recommendations from the STB's Office of Environmental Analysis on the preferred alternative and mitigation measures. No project-related construction may begin until the STB's final decision has been issued and has become effective.

S.15.4 California High-Speed Rail Authority Decision Making

After completion of the environmental process, the Authority will consider whether to certify the Final EIR/EIS for compliance with CEQA. Once the Authority certifies the Final EIR/EIS, it can approve the project and make related CEQA decisions (findings, mitigation plan, and potential statement of overriding considerations). The required CEQA findings prepared for each significant effect will be one of the following:

- Changes or alternatives have been required or incorporated into the project that avoid or substantially lessen the significant environmental effect as identified in the Final EIR/EIS.
- Changes or alternatives are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency.
- Specific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or HSR alternatives identified in the Final EIR/EIS.

If the Authority proceeds with approval of the project, the Authority would file a Notice of Determination (NOD) that describes the project and whether the project will have a significant effect on the environment. If the Authority approves a project that will result in the occurrence of significant effects identified in the Final EIR/EIS but not avoided or substantially lessened, CEQA requires the preparation of a Statement of Overriding Considerations which provides specific reasons to support the project, including economic, legal, social, technological, or other benefits of the proposed project that outweigh unavoidable adverse environmental effects. If such a statement is prepared, the Authority's NOD will reference the statement.

For purposes of this [section name] Section EIR/EIS, project approval would include selection of an alignment alternative and selection of station locations. Add text if necessary to discuss HMF sites.

S.15.5 Project Implementation

After the issuance of the FRA's ROD, and the Authority's NOD, the Authority would complete final design, obtain construction permits, and acquire property before construction.

S.16 Product

The RC is responsible for preparing the EIR/EIS Summary, under Authority and FRA direction, according to Program Management Team guidance, quality control and assurance.

S.17 Summary EIR/EIS Outline

The RC will use the following outline for organizing content related to the Summary of the project EIR/EIS, using the heading hierarchy and format as indicated. Present summary tables (e.g., Table S-3 showing impacts that differentiate the alignments and design options) at the end of the Summary chapter, after text content.

Summary
S.1 Introduction and Background
S.2 Tiered Environmental Review: Final Statewide Program EIR/EIS and [section name] Section Project EIR/EIS
S.3 Issues Raised During the Scoping Process
S.4 Purpose of and Need for the HSR System and the [section name] Section
    S.4.1 Purpose of the HSR System
    S.4.2 Purpose of the [section name] Section
    S.4.3 Objectives and Policies for the HSR System in California and within the [section name] Region
    S.4.4 Need for the HSR System Statewide and within the [section name] Region
S.5 Alternatives
    S.5.1 No Project Alternative
    S.5.2 [section name] Section Alternatives
    S.5.3 Station Areas
S.6 Features to Avoid and Minimize Impacts

1 PROJECT PURPOSE, NEED, AND OBJECTIVES

This chapter provides background for an HSR project and describes the purpose, need, and objectives of the project. The methodology is based on the purpose and need chapter in the *Fresno to Bakersfield Section Final Environmental Impact Statement/Environmental Impact Report* (EIR/EIS) (April 2014) with examples drawn from that chapter.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the chapter. Example text that illustrates the concepts and methods is shown in *italics*. The methods are organized to mirror the organization of the EIR/EIS chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

1.1 Introduction

1.1.1 The High-Speed Rail System

The following text from the *Fresno to Bakersfield Section Final EIR/EIS* can be used for the Introduction.

The California High-Speed Rail Authority (Authority) proposes to construct, operate, and maintain an electric-powered high-speed rail (HSR) system in California. When completed, the nearly 800-mile train system would provide new passenger rail service to more than 90 percent of the state's population. More than 200 weekday trains would serve the statewide intercity travel market.[1] The HSR system would be capable of operating speeds of up to 220 miles per hour (mph), with state-of-the art safety, signaling, and automated train control systems collectively known as the enhanced Automatic Train Control system, which will include all positive train control functions and be compliant with the requirements of 49 C.F.R. Part 236I. The system would connect and serve the major metropolitan areas of California, extending from San Francisco and Sacramento in the north to San Diego in the south (Figure 1-1).

Following programmatic environmental review, the Authority and the Federal Railroad Administration (FRA) approved the HSR System for intercity travel in California and selected corridors for project-level study. Building a system of such magnitude, complexity, and cost is impractical to implement as a single project. The Authority divided the HSR System into nine project sections, allowing phased system implementation. This approach is consistent with the provisions of Proposition 1A, *the Safe, Reliable, High-Speed Passenger Train Bond Act* (California Streets and Highways Code, Division 4, Chapter 20, Section 2704 et seq.) adopted by California voters in November 2008.

[1] "Intercity rail passenger transportation" is defined at 49 U.S.C. 24102(4) as "rail passenger transportation except commuter rail passenger transportation." An intercity passenger rail service consists of a group of one or more scheduled trains (roundtrips) that provide intercity passenger rail transportation between bona fide travel markets (not constrained by state or jurisdictional boundaries), generally with similar quality and level-of-service specifications, within a common (but not necessarily exclusive or identical) set of identifiable geographic markets (FRA 2010). Similarly, "commuter rail passenger transportation" is defined at 49 U.S.C. 24102(3) as "short-haul rail passenger transportation in metropolitan and suburban areas usually having reduced fare, multiple ride, and commuter tickets and morning and evening peak period operations."

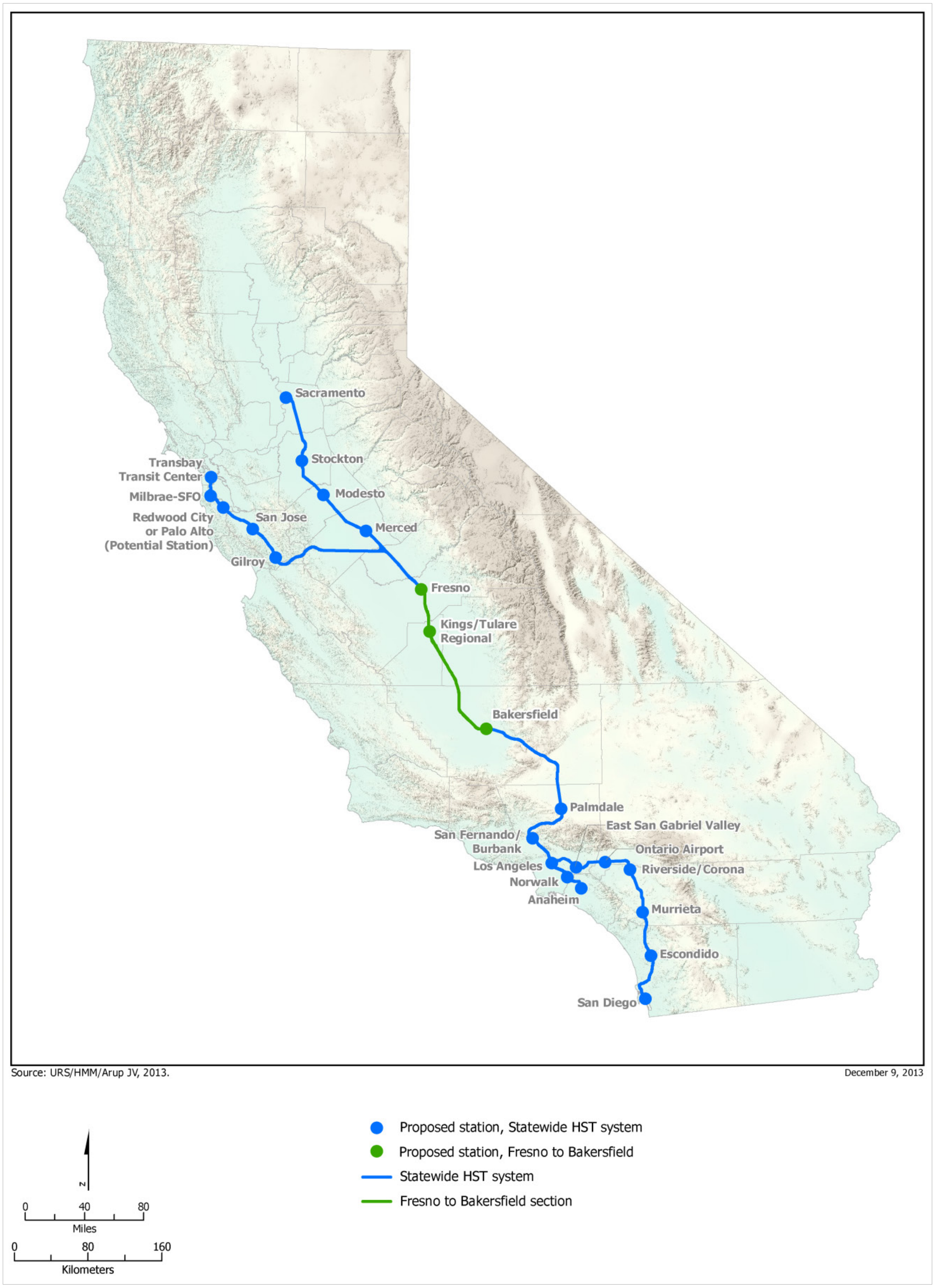


Figure 1-1 Statewide HSR System

1.1.2 The [section name] HSR Project

The following example text from the *Fresno to Bakersfield Section Final EIR/EIS* can be tailored for the applicable project section.

> *The Fresno to Bakersfield HSR Project section would connect a Fresno station, a Kings/Tulare Regional station in the Hanford/Visalia/Tulare area, and a Bakersfield station. The planned HSR line north of the Fresno to Bakersfield Section would extend to Merced. A planned HSR line west of the Merced to Fresno Section is through the Pacheco Pass, connecting the San Francisco to San Jose HSR Project to the Central Valley*[2] *and the rest of the HSR System. South of the Bakersfield station, the HSR line would continue to Los Angeles via Palmdale.*

1.1.3 The HSR Environmental Review Process

Some of the following text from the *Fresno to Bakersfield Section Final EIR/EIS* can be used to describe the HSR environmental review process, while other aspects are provided as examples.

The Authority and FRA have prepared program-wide (Tier 1) environmental documents for the HSR System under the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Specifically, the Authority and FRA prepared a *Statewide Program Environmental Impact Report/Environmental Impact Statement* (EIR/EIS) (Authority and FRA 2005) to evaluate the ability of the HSR System to meet the existing and future capacity demands on California's intercity transportation system. *The Authority and FRA also prepared the Bay Area to Central Valley HSR Program EIR/EIS (Authority and FRA 2008) to identify a corridor alignment and the station locations for the connection between the Bay Area and the Central Valley.*

Section 1.5, Tiering of Program EIR/EIS Documents, discusses these documents and the process under which this project-level EIR/EIS tiers off the earlier documents, which are collectively referred to as the "Program EIR/EIS documents" throughout this EIR/EIS.

The Authority and FRA prepared these program-level (Tier 1) documents in coordination with the U.S. Environmental Protection Agency (USEPA) and the U.S. Army Corps of Engineers (USACE) and their determination that under the federal Clean Water Act, the [preferred alignment] is most likely to yield the least environmentally damaging practicable alternative (LEDPA).

Tier 2 of the HSR development process includes additional engineering and design and preparation of project-level EIR/EISs for all HSR project sections. This *[section name] Section EIR/EIS (Tier 2)* evaluates proposed alignments and stations in site-specific detail to provide a complete assessment of the direct, indirect, and cumulative effects of the proposed action, considers public and agency participation in the screening process, and was developed in consultation with resource and regulatory agencies, including USEPA and USACE. FRA and the Authority intend this document to be sufficient to support Section 404 permit decisions and Section 408 permit decisions (as applicable) for alteration/modification of completed federal flood risk management facilities, and any associated operation and maintenance, and real estate permissions or instruments (as applicable).

1.1.4 Lead Agencies, Cooperating Agencies, and Responsible Agencies

The following text from the *Fresno to Bakersfield Section Final EIR/EIS* can be used to describe these roles.

The following is provided to clarify the roles of lead, cooperating, and responsible agencies under NEPA and CEQA. More information on the roles of cooperating and responsible agencies is provided in Section 2.9.

[2] The Sacramento and San Joaquin valleys combined are called the Central Valley.

For the California HSR System, including the [section name] Section, FRA is the lead federal agency for compliance with NEPA and other federal laws. FRA administers the High-Speed Intercity Passenger Rail Program and has awarded California $3.48 billion in grant funding for HSR system construction in the Central Valley. FRA also has primary responsibility for developing and enforcing rail line safety regulations in accordance with Title 49 United States Code, Subtitle V, Part A (49 U.S.C. § 20101 et seq.), the Rail Safety Improvement Act of 2008 (Public Law 110-432). The Authority is the project sponsor under NEPA.

There are two cooperating agencies included in this NEPA review process. The USACE agreed by letter, dated December 30, 2009, to participate as a cooperating agency under NEPA. The Surface Transportation Board (STB), by letter dated May 2, 2013, is also participating as a cooperating agency under NEPA.[3] Multiple other federal agencies have been involved and contributed to the NEPA process, including USEPA, U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), National Parks Service (NPS), and the Advisory Council on Historic Preservation.

Between the release of the Revised Draft EIR/Supplemental Draft EIS (DEIR/SDEIS) and the Final EIR/EIS for the Fresno to Bakersfield Section, the Authority filed with STB a petition for exemption of STB's prior approval requirements to construct the Merced to Fresno Section. Concurrently, the Authority filed a motion to dismiss the STB proceeding asserting that the Merced to Fresno Section is not subject to STB jurisdiction and so did not require STB's construction approval under 49 U.S.C. §§ 10901 or 10502.[4] In a decision issued April 18, 2013, STB found that it has jurisdiction over the entire proposed California HSR System and, consequently, denied the motion to dismiss. As STB later explained in detail on pp. 11-17 of its June 13, 2013, decision authorizing construction of the 65-mile segment of the HSR System between Merced and Fresno, 49 U.S.C. § 10501(a)(2)(A) gives STB jurisdiction over transportation by rail carrier in one state, as long as that intrastate transportation is carried out "as part of the interstate rail network." Because the HSR System would have extensive connectivity with Amtrak, which has long provided interstate passenger service, STB determined that the HSR System would be constructed as part of the interstate rail network. Therefore, STB has jurisdiction over all nine of the proposed HSR sections, including the Fresno to Bakersfield Section.

In light of STB's jurisdictional decisions, the Authority considered potential applicability of federal preemption. Specifically, the provisions of the ICC Termination Act of 1995 (49 U.S.C. § 10501(b)) make STB's jurisdiction "exclusive" for all transportation by rail carriers, including the facilities and structures that are an integral part of that transportation. Section 10501(b) also expressly states that "the remedies provided under this part are exclusive and preempt the remedies provided under Federal and State law." As a general matter, STB itself and case law interpreting section 10501(b) have concluded that state environmental review or permit requirements, such as CEQA, are preempted.

In 2009, the environmental review process for the Fresno to Bakersfield Section commenced as a joint EIR/EIS to comply with the requirements of both CEQA and NEPA. The Draft EIR/EIS released in 2011 and the Revised DEIS/SDEIS released in 2012 included the requisite analysis for compliance with both laws. To avoid confusion, and in light of the timing of STB's jurisdictional decision, the Authority elected to complete the document as a Final EIR/EIS, with all requisite analysis for compliance with both CEQA and NEPA. Completing the state environmental review

[3] The Surface Transportation Board (STB) is a bipartisan, independent adjudicatory body, organizationally housed within the U.S. Department of Transportation. The Board was established by the ICC Termination Act of 1995 (49 U.S.C. §10101 et seq.; Public Law 104-88, December 29, 1995) to assume some, but not all, functions of the ICC. STB has jurisdiction over the construction and operation of new rail lines (49 U.S.C. 10901, 10502).
[4] The Authority submitted its request for authority to construct the Merced to Fresno Section on March 31, 2013. The Authority's request and the motion to dismiss are available on STB's website at www.stb.dot.gov (click "Filings" under "Quick Links," then search by Docket # "FD" and "35724"). STB's Merced to Fresno Section decisions are also available on its website (click "Decisions" under "Quick Links," then search by Docket # "FD" and "35724").

process does not waive any preemption argument that may be available to the Authority in the event of legal challenge.

> *The following California agencies (state and regional) identified to date would have to issue permits or approvals for the [section name] HSR Section, and therefore would be CEQA responsible agencies (with the Authority being the lead agency), in the absence of STB jurisdiction: California Department of Fish and Wildlife (CDFW), California Department of Transportation (Caltrans), California Public Utilities Commission (CPUC), California State Lands Commission (SLC), State Water Resources Control Board (SWRCB), Central Valley Flood Protection Board (CVFPB), and San Joaquin Valley Air Pollution Control District. The Final EIR/EIS can be used by those agencies either through the provisions of CEQA Guidelines Section 15220 et seq. or CEQA Guidelines Section 15096 to approve or permit aspects of the HSR project that the agency is responsible for.*

1.1.5 Consistency with Federal Transportation Policy

The following text from the *Fresno to Bakersfield Section Final EIR/EIS* can be used to describe consistency with federal policy.

In 2008, Congress enacted a major reauthorization of intercity rail passenger programs, creating a new priority for rail passenger services in the nation's transportation system. The Passenger Rail Investment and Improvement Act of 2008 (Division B of Public Law 110-432) authorized the appropriation of federal funds to support high-speed and intercity rail passenger services implementation, including authority for the Secretary of Transportation to establish and implement a high-speed rail corridor development program. In the American Recovery and Reinvestment Act of 2009 (Public Law 111-5), Congress appropriated $8 billion in capital assistance for high-speed rail corridors and intercity passenger rail service. Congress provided an additional $2.5 billion for this program in the Department of Transportation Appropriations Act of 2010 (Title I, Division A of the Consolidated Appropriations Act, 2010). Available funding was reduced by $400 million in the Full-Year Continuing Appropriations Act, 2011 (Public Law 112-110). FRA issued a Strategic Plan, *A Vision for High-Speed Rail in America* (FRA 2009), which describes the agency's plan for intercity passenger rail development and subsequent program guidance to implement the High-Speed Intercity Passenger Rail Program with funding provided by Congress through the appropriations acts.

The HSR System is also consistent with recent expressions of federal multimodal transportation policy—most notably, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, the Transportation Equity Act for the 21st Century (Public Law 109-59, August 10, 2005), and its predecessor, the Intermodal Surface Transportation Efficiency Act of 1991 (Public Law 102-240, December 18, 1991), which encourage public transportation investment that increases national productivity and domestic and international competition, while improving safety and social and environmental conditions. Specifically, these policies encourage investments that offer benefits such as the following:

- Link all major forms of transportation
- Improve public transportation systems and services
- Provide better access to seaports and airports
- Enhance efficient operation of transportation facilities and service

1.2 Purpose of and Need for the HSR System and the [section name] Section

1.2.1 Purpose of the HSR System

The following text from the *Fresno to Bakersfield Section Final EIR/EIS* can be used to describe the purpose of the HSR System.

The program EIR/EISs identified and evaluated alternative HSR corridor alignments and stations as part of a statewide HSR system and established the purpose of the HSR System. The purpose of the statewide HSR System is to provide a reliable high-speed electrified train system that links the major metropolitan areas of the state and that delivers predictable and consistent travel times. A further objective is to provide an interface with commercial airports, mass transit, and the highway network and relieve capacity constraints of the existing transportation system as increases in intercity travel demand in California occur, in a manner sensitive to and protective of California's unique natural resources (Authority and FRA 2005).

1.2.2 Purpose of the [section name] Section HSR Project

The following text from the *Fresno to Bakersfield Section Final EIR/EIS* can be used to describe the purpose of the specific project section.

The purpose of this project is to implement the [section name] Section of the California HSR System to provide the public with electric-powered high-speed rail service that provides predictable and consistent travel times between major urban centers and connectivity to airports, mass transit, and the highway network in the [project area] and connect the northern and southern portions of the system.

For Clean Water Act Section 404(b)(1) compliance, USACE must take into consideration the applicant's needs in the context of the geographic area of the proposed action and the type of project being proposed. FRA, the Authority, USACE, and USEPA signed a Memorandum of Understanding (MOU) in November 2010 to integrate the NEPA and 408 and 404 permitting processes. The integration process comprises three checkpoints which punctuate ongoing coordination efforts. Checkpoint A defines the purpose and need for the Tier 2 project. Checkpoint B identifies the range of alternatives to be studied in the project EIR/EIS. Checkpoint C is the preliminary LEDPA determination which receives USACE concurrence. In Checkpoint A, the USACE determined that the overall project purpose (as stated above) allows for a reasonable range of practicable alternatives to be analyzed and is acceptable as the basis for the USACE 404(b)(1) alternatives analysis.

1.2.3 CEQA Project Objectives of the HSR System in California and in the [section name] Section Area

The following text from the *Fresno to Bakersfield Section Final EIR/EIS* can be used to describe the CEQA project objectives of the specific project section.

The Authority's statutory mandate is to plan, build, and operate an HSR system coordinated with California's existing transportation network, particularly intercity rail and bus lines, commuter rail lines, urban rail lines, highways, and airports. In accordance with Section 15124 of the CEQA Guidelines, the Authority has responded to this mandate by adopting the following objectives and policies for the proposed HSR System:

- Provide intercity travel capacity to supplement critically over-used interstate highways and commercial airports
- Meet future intercity travel demand that will be unmet by current transportation systems and increase capacity for intercity mobility
- Maximize intermodal transportation opportunities by locating stations to connect with local transit, airports, and highways
- Improve the intercity travel experience for Californians by providing comfortable, safe, frequent, and reliable high-speed travel
- Provide a sustainable reduction in travel time between major urban centers
- Increase the efficiency of the intercity transportation system

- Maximize the use of existing transportation corridors and rights-of-way, to the extent feasible
- Develop a practical and economically viable transportation system that can be implemented in phases by 2030 and generate revenues in excess of operations and maintenance costs
- Provide intercity travel in a manner sensitive to and protective of the region's natural and agricultural resources and reduce emissions and vehicle miles traveled for intercity trips

The approximately [#]-mile-long [section name] Section is an essential component of the statewide HSR System. As part of the [project area] section of the HSR System, the [section name] Section would provide [cities along alignment] access to a new transportation mode; contribute to increased mobility throughout California; and [add anything specific for the project such as HMF facilities, test tracks, etc.]. Because a minimum of 100 miles of track is needed to demonstrate train speeds of up to 220 miles per hour (mph), the [section name] Section would provide a sufficient length of track for testing the trains. The [section name] Section is critical for demonstrating system performance, commissioning trains, and obtaining the safety certification needed before service can be permitted. Figure 1-2 shows the [section name] Section project corridor.

1.2.4 Statewide and Regional Need for the HSR System in the [section name] Section

The following text from the *Fresno to Bakersfield Section Final EIR/EIS* is provided as an example of the introductory discussion. The Regional Consultant (RC) must work closely with the Authority and FRA to create a strong statement of the regional need. Create a figure that shows the location of the corridor as per the example on Figure 1-2.

> *The need for an HSR System exists statewide, with regional areas contributing to this need. The [section name] Section is an essential component of the statewide HSR System.*
>
> *The capacity of California's intercity transportation system, including the [project area], is insufficient to meet existing and future travel demand. The current and projected future system congestion will continue to result in deteriorating air quality, reduced reliability, and increased travel times. The system has not kept pace with the tremendous increase in population, economic activity, and tourism in the state, including that in [project area]. The interstate highway system, commercial airports, and conventional passenger rail system serving the intercity travel market are operating at or near capacity and will require large public investments for maintenance and expansion to meet existing demand and future growth over the next 25 years and beyond. Moreover, the feasibility of expanding many major highways and key airports is uncertain; some needed expansions may be impractical or may be constrained by physical, political, and other factors. The need for improvements to intercity travel in California, including intercity travel between [project area], the Bay Area, Sacramento, and Southern California, relates to the following issues:*

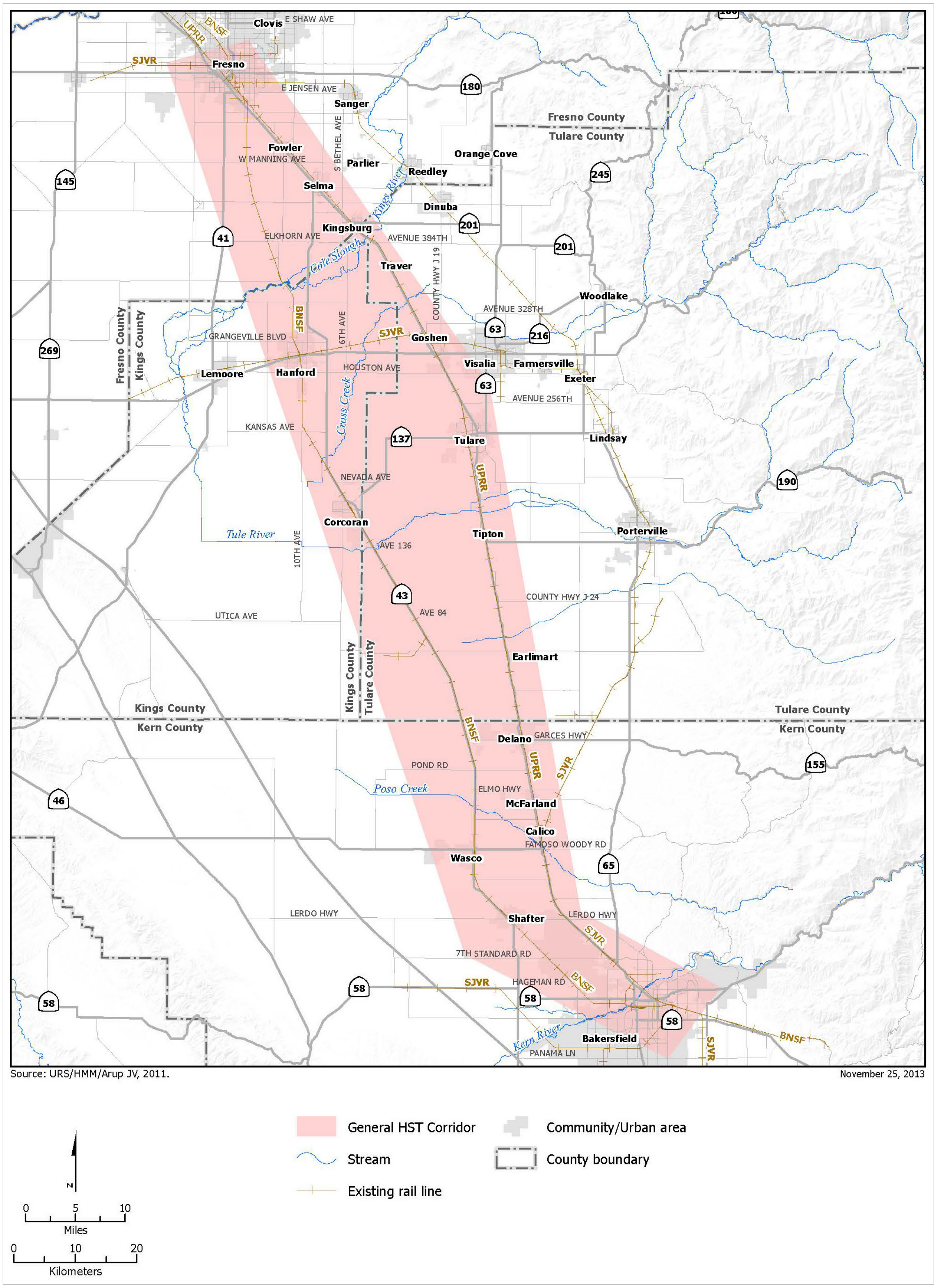


Figure 1-2 Section HSR Project Corridor Figure (example only)

- *Future growth in demand for intercity travel, including the growth in demand within [project area]*
- *Capacity constraints that will result in increasing congestion and travel delays, including those in [identify locations of congestion and travel delay in the project area]*
- *Unreliability of travel stemming from congestion and delays, weather conditions, accidents, and other factors that affect the quality of life and economic well-being of residents, businesses, and tourism in California, including within [project area]*
- *Reduced mobility as a result of increasing demand on limited modal connections between major airports, transit systems, and passenger rail in the state, including within [project area]*
- *Poor and deteriorating air quality and pressure on natural resources and agricultural lands as a result of expanded highways and airports and urban development pressures, including those within [project area]*

Figure 1-2 shows the location of [section name] Section within California. This region contributes significantly to the statewide need for a new intercity transportation service that would connect it with the major population and economic centers and to other regions of the state.

1.2.4.1 Travel Demand and Capacity Constraints

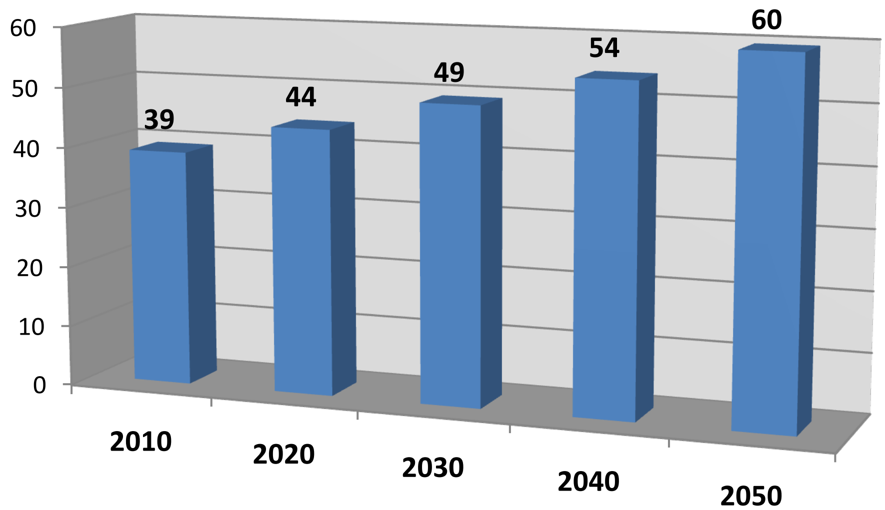
The following discussion from the Fresno to Bakersfield Section Final EIR/EIS is provided as example text. Update this information using current forecasting data. The Program Management Team (PMT) will provide the raw data to the RC for development into this discussion of travel demand and capacity constraints.

Intercity travel in California, including travel within the [project area], is driven primarily by increased demand for such travel. Growing population, tourism, and economic growth generate this demand.

Population and Economic Growth

According to the California Department of Finance (2010), California's population should increase by 12.5 million residents between 2010 and 2035. This means an increase from about 39 million to 51.5 million people (more than a 30 percent growth). Figure 1-3 illustrates this growth. The population is expected to grow steadily to about 60 million people by 2050 (California Department of Finance 2010).

Much of this population growth will be accommodated in the metropolitan coastal areas or in Southern California's Inland Empire. However, growth and development in these regions are increasingly challenged because of environmental and quality-of-life issues, including the high housing prices. These areas are finding it increasingly difficult to accommodate new development; and despite economic pressure to grow, the combination of rising costs and local opposition is likely to push a substantial number of people to seek homes and employment elsewhere. Insert text here that describes the anticipated function and role of the region to be served by this HSR section with the overall California growth predictions.



Source: State of California, Department of Finance, Population Projections by Race/Ethnicity for California and its Counties 2000-2050, March 2010.

Figure 1-3 Current and Future California Population (in millions) (example only)

Include the following discussions related to population and economic growth.

- Describe the relationship of the projected project section population growth with the projected statewide growth. Use a table to illustrate the projected growth by county, region, and state as per the example in *Table 1-1*.

Table 1-1 Population Growth in California, [project area], and the Counties of [project area] (example only)

Area	Population		
	2010	2035	Percent Growth 2010 to 2035
[separate row for each county]			
[project area][1]			
California			

[1] [project area] includes [names of counties] counties.
Sources: California Department of Finance 2009, 2010.

- Describe the economic drivers for the region and for each of the counties in the region. Identify the role of the economic drivers in attracting businesses. Identify the leading sectors of employment for the region.
- Describe unemployment and per capita income for the region as compared to California. Identify any measures to improve regional with high unemployment. Use a table to show unemployment and income in the counties as compared to California per the example in *Table 1-2*.

Table 1-2 Unemployment and Income in California and in the Counties of [project area] (example only)

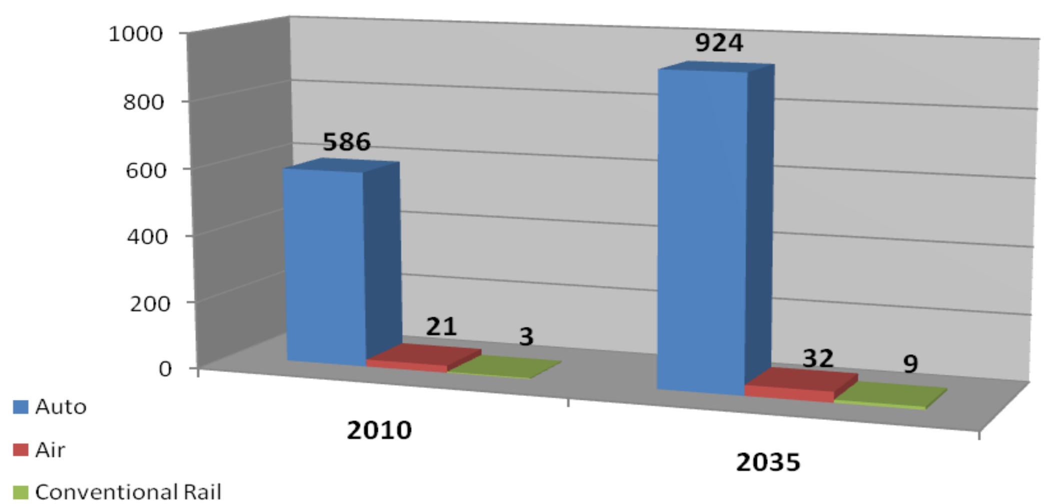
Area	Unemployment Rate (2010)	Per Capita Income (2010)
California	11.4%	$43,852
[separate row for each county]		

Sources: California Employment Development Department 2010; U.S. Department of Commerce 2010.

Travel Demand

The following text from the *Fresno to Bakersfield Section Final EIR/EIS* is provided as an example for the discussion of travel demand.

> *Population growth and the increasing interconnectedness of the [project area] economies [identify how major transportation corridor(s) in the region are affected]. Overall, intercity travel in California is forecast to increase by more than 58 percent between 2010 and 2035, from 610 million trips to about 965 million trips, as illustrated on* Figure 1-4. *[identify how major transportation corridor(s) in the region are affected]*
>
> *It was estimated that in 2010, Californians would make 610 million trips between the state's metropolitan regions in Northern and Southern California and those in between. Approximately 209 million of these trips would be journeys of at least 100 miles; by 2035, this number is expected to increase to more than 271 million trips per year. Overall, intercity travel in California is forecast to increase by more than 58 percent between 2010 and 2035, from 610 million trips to about 965 million trips (Figure 1-4).*



Source: Parsons Brinckerhoff 2010, based on Cambridge Systematics 2007 projections.

Figure 1-4 Intercity Trips in California (in millions) (example only)

> *The automobile will continue to predominate in intercity travel and, by 2035, is expected to account for more than 95 percent of all intercity travel and close to 90 percent of longer intercity trips. Figure 1-5 illustrates the major routes and airports used for intercity travel between the markets potentially served by the HSR System.*

Figure 1-5 Major Intercity Travel Routes and Airports (example only)

Freeway Congestion and Travel Delays

Describe the operational characteristics of the regional highway system. An example discussion as contained in the *Fresno to Bakersfield Section Final EIR/EIS* is provided below.

> *Travel within the San Joaquin Valley in general, and the Fresno to Bakersfield area in particular, is largely dependent on SR 99 for intercity trips. SR 99 is the principal connection between the major cities in the San Joaquin Valley region, and it currently carries from 38,000 to more than 100,000 in annual daily traffic (Caltrans 2009a). However, most of SR 99 was built in the late 1950s and early 1960s to accommodate a smaller population and transportation infrastructure demands. Not only is the population increasing rapidly in the south San Joaquin Valley, but growth is also taking place in land use patterns that rely on automobiles for most trips. Currently, and over the next 10 to 15 years, depending on available funding, the California Department of Transportation (Caltrans) has begun implementing the Route 99 Corridor Business Plan, which*

will remove remaining at-grade intersections and improve others to higher capacity. The plans call for widening the route between Fresno and Bakersfield from four to six lanes, and sometimes six lanes with auxiliary lanes, to ease traffic flow between interchanges. This plan, however, will not reduce future congestion projected along SR 99 through 2035. According to the Route 99 Corridor Business Plan, only a shift in vehicle travel to alternative modes can restore better traffic flows (Caltrans 2009a).

Describe how vehicle miles traveled are anticipated to change from current conditions to 2035. Example text and table from *the Fresno to Bakersfield Section Final EIR/EIS* is provided below.

The vehicle miles traveled (VMT)[5] *in Fresno, Kings, Tulare, and Kern counties in 2010 are provided in Table 1-3. This is expected to essentially double by 2035, as Table 1-3 shows forecast travel increases by county. In Kings and Tulare counties, approximately 50 percent of all VMT occurs on the state highway system, while VMT in Fresno and Kern counties on Caltrans routes are 40 percent and 60 percent of travel, respectively (Caltrans 2009b).*

Table 1-3 Current and Projected Vehicle Miles Traveled in the South San Joaquin Valley (example only)

County	Vehicle Miles Traveled (millions)		
	Existing Conditions[1]	Annual Growth Rate (%)	Year 2035 Projection
Fresno County	21.70	2.0	37.11
Kings County	3.80	2.0	6.17
Tulare County	10.42	2.5	20.27
Kern County	22.65	—	32.90

[1] Existing conditions are 2008 conditions for Fresno and Tulare counties, 2006 conditions for Kern County, and 2010 conditions for Kings County.
Sources: Council of Fresno County Governments 2004, Table 2.2; Kern Council of Governments 2010a, Table 2.2; Kings County Association of Governments 2007, Table 2.2; Tulare County Association of Governments 2007, Table 2.2.

Caltrans' goal for state highway facilities is level-of-service (LOS) B through D on a scale of A to F, where A is unencumbered travel and F is stop-and-go traffic flow. Describe how state highway facilities within the region are currently operating (LOS) and whether they are meeting Caltrans' goal. Describe projected LOS for the state facilities and any projected improvements to these facilities. Determine whether these facilities would meet Caltrans operating standards in 2025.

The [project area] [exemplifies/does not exemplify] the statewide growth patterns and trends, where much of the intercity travel in California consists of trips of intermediate distance. *Table 1-4* shows the statewide forecasting model results for expected growth in traffic volumes on major highways within the next 25 years. These trips include more than [###] million annual intercity trips between the [project area] and other metropolitan areas, or [###] percent of all intercity travel.

[5] The total miles traveled by all vehicles in a specified area during a specified time.

Table 1-4 Travel Growth for Intercity Highways (example only)

[Add other major highways in the region to the table]

Major Highways	Average Daily Volume 2010	Average Daily Volume 2035	Change
Interstate 5 (I-5) between San Diego and Los Angeles (Orange County–Los Angeles County line)	185,000	342,000	85%
I-5 between Los Angeles and Bakersfield (at Santa Clarita)	222,000	332000	50%

Source: Parsons Brinckerhoff 2010.

Freight Movement

Provide the following information for freight movement.

- Describe freight movement patterns in the region for trucks and via the railroads.
- Identify daily truck volumes and percentage of total freight carried by trucks.
- Identify railways serving the region and the daily volumes of freight trains through the region.
- Compare freight movement by truck to freight movement by train in the region. Identify products carried by trucks and trains.

Conventional Passenger Rail

Provide the following information for Amtrak service in the HSR section corridor.

- Name of the Amtrak service route and ownership of railroad tracks
- Number of daily trips in each direction along the route
- Ridership numbers and percentage increase over year 2000
- Number of daily trips and ridership numbers for the service
- Travel time between origin and destination points by train and by car

The following text from the *Fresno to Bakersfield Section Final EIR/EIS* can be added to this discussion as applicable to the project section.

Passenger train service is often adversely affected by freight train operations, resulting in longer travel times and less schedule predictability for train passengers. To increase ridership on the [route name], the *California State Rail Plan 2007–2008 to 2017–2018* (Caltrans 2008a) seeks to improve the frequency of travel and on-time performance by implementing capital and operational improvements. Section 1.6, *2012 Business Plan,* provides additional information on blending the HSR System with existing rail systems on shared infrastructure.

Air Travel

The following text from the *Fresno to Bakersfield Section Final EIR/EIS* is provided as an example for the introduction to the discussion of air travel. Data should be updated by more recent projections whenever possible.

> *Air travel demand has been growing steadily in California and nationwide; federal, state, and regional transportation plans forecast continued growth in air travel over the next several decades. By 2005, Los Angeles to San Francisco was the busiest air travel route in the U.S., with 8.6 million trips annually, representing about 43 percent of the intercity trips in this market for all transportation modes (Cambridge Systematics 2008). In 2009, approximately 13 million passengers are estimated to have traveled between major Northern*

> *and Southern California airports. In addition, far fewer commercial air trips were made to and from [project area] airports, which do not fall within the top 100 corridors in the U.S. Without HSRs, more than 3 percent of all intercity travel statewide and approximately 10 percent of longer intercity trips (those in excess of 100 miles) are forecast to be air travel.*

Following the introductory paragraph, provide the following information on air travel in the HSR section region.

- The names and locations of the airports in the region providing commercial service
- The intercity service provided at these airports (number of enplanements, carriers, airports served) as illustrated by the example in *Table 1-5*
- The use of the regional airports and air travel in the region as compared to the use of the automobile for reaching destinations
- Factors that contribute to use of regional airports vs. use of the automobile

Table 1-5 Commercial Air Traffic and Central Valley Airports (example only)

Airport	Total 2010 Forecast Enplanements[1]	Estimated 2010 In-State Enplanements	Number of Carriers Providing In-State Service	In-State Airports Served
Sacramento International Airport (SMF)	4,309,623	2,037,724	12	Arcata, Burbank, Los Angeles, Long Beach, Ontario, Palm Springs, San Diego, San Francisco, San Jose, Santa Barbara, Orange County (Santa Ana)
Fresno-Yosemite International Airport (FAT)	575,709	199,680	8	San Francisco, Los Angeles
Meadows Field—Bakersfield (BFL)	123,959	78,000	2	San Francisco, Los Angeles

[1] *Source: FAA 2010.*

The following text from the *Fresno to Bakersfield Section Revised DEIR/Supplemental DEIS* is an example of use of international airports by residents of the HRS section region and the constraints at these airports. Data should be updated by more recent projections whenever possible.

> *Despite the distance of the [names of airports] airports from [names of counties] counties, many people in the [project area] nonetheless use these airports. Annual passenger demand at San Francisco International Airport (SFO) increased from 31 million passengers in 1990 to 37.4 million in 2009 (Airports Council International 2010). By 2035, annual passenger demand at SFO is projected to reach 64.4 million passengers, and the airport is projected to exceed capacity. However, with unconstrained airport demand, SFO could reach its capacity as early as 2020. In 1998, SFO started undertaking studies to address the capacity constraints associated with its existing runway configuration. These studies included plans for new runways to be constructed on fill placed in San Francisco*

Bay, because no inland expansion of the airport is feasible. Because of environmental concerns and public opposition, these plans were withdrawn, and in 2008 the San Francisco Board of Supervisors passed a resolution declaring that no additional fill should be placed in San Francisco Bay for new or reconfigured runways at SFO. Because of these capacity constraints, SFO will likely be forced to reduce air service in intercity travel markets with high levels of service (such as that between LAX and SFO) (Mays 2008).

The future level of travel demand is noteworthy because both SFO and LAX are among the most capacity-constrained airports in the nation (together with New York and Philadelphia). A federal Aviation Administration (FAA) study that examined future demand and operational capacity identified both SFO and LAX as needing additional capacity by 2015, even with the planned improvements currently proposed. The report noted that SFO will serve as an example of a capacity-constrained metropolitan area where runway construction may not be an option given environmental considerations and policy directives (e.g., the 2008 resolution of the San Francisco Board of Supervisors discussed above). Other smaller airports in the San Francisco and Los Angeles travel markets (e.g., Oakland) were also identified as needing capacity improvements. Because of existing constraints to the expansion of airports, the study concludes that other solutions, including regional sharing of air travel among local airports, market mechanisms, and consideration of high-speed ground travel modes, will be needed to alleviate the demand and capacity constraints. The HSR System, including the [section name] Section, would help to alleviate these capacity constraints at SFO and LAX by providing a new intercity transportation mode and improving the transportation accessibility of the [project area].

Travel Time

Describe how travel times between city pairs will change over time. Example text and table from the *Fresno to Bakersfield Section Final EIR/EIS* is provided below.

Similar to the southern San Joaquin Valley, with growing demand for intercity travel and growing capacity constraints, the total automobile travel time will increase statewide. Air and rail travel time will remain basically the same. Table 1-6 shows the approximate total travel time in 2010 and the projected total travel time in 2035 for automobile, air, and rail between various city pairs. These data come from the ridership analysis completed for the HSR forecasting model information from regional transportation planning agencies, Caltrans, and current air and conventional rail schedules.

While air travel time will not change, the number of desired flights to a given destination may be limited by runway capacity, thus reducing flexibility in travel dates available. Projected increases in automobile travel time will be caused largely by growing travel demand and resulting congestion on highways used for intercity travel. Programmed and funded highway improvements will not measurably change future conditions. Some capacity improvements have been funded for the San Joaquin Valley and in Southern California, but these are basic enhancements intended to improve reliability rather than travel time. The Amtrak plan for the next 10 years includes adding one more round trip per day between Oakland and Bakersfield and reducing the travel time between these two cities to below 6 hours (Caltrans 2008b). These improvements will provide some benefit to rail passengers, but will not provide substantial passenger rail capacity to the San Joaquin Valley.

Table 1-6 Estimated Total Travel Times (Door-to-Door in Hours and Minutes) between City Pairs by Auto, Air, and Rail (Peak Conditions) (example only)

City Pair	Auto 2010	Auto 2035	Air 2010[1,2]	Air 2035[1,2]	Conventional Rail 2010 and 2035[2,3]
Downtown Los Angeles to Downtown San Francisco	8:10	9:04	4:40	4:42	9:45[4]
Downtown Fresno to Downtown Los Angeles	4:35	5:28	4:02	4:01	5:03[5]
Los Angeles downtown to San Diego downtown	4:13	5:09	3:24	3:24	3:19
Burbank (Airport) to Downtown San Jose	6:57	7:08	4:39	4:32	10:40[6]
Downtown Sacramento to Downtown San Jose	3:09	3:36	4:40	4:36	4:06

[1] Represents the same level of service observed in 2005, compiled from the Federal Aviation Administration data from the 10% ticket sample combined with wait, terminal, access, and egress times developed from the California High-Speed Rail ridership forecasting model (Cambridge Systematics 2010).
[2] Access and egress times based on transit connections.
[3] Conventional rail assumptions for travel times and wait and terminal times are the same for 2010 and 2035. Access and egress times may vary, but in practice do not vary significantly between 2010 and 2035.
[4] Based on April 23, 2010, San Joaquin schedule, which would require bus connections from Los Angeles to Bakersfield and from Emeryville to San Francisco.
[5] Based on April 23, 2010, San Joaquin schedule, which would require bus connections from Los Angeles to Bakersfield.
[6] Based on April 23, 2010, San Joaquin schedule, which would require bus connections from Burbank to Bakersfield and from Stockton to San Jose.
Source: Parsons Brinckerhoff 2010 (based on Cambridge Systematics data).

Continuing population and increasing tourism in California place severe demands on the already congested transportation system serving the state's major metropolitan areas. As described in the regional transportation plans for areas to be served by the proposed HSR System, the highways serving key cities are operating at capacity, and plans for expansion will not keep pace with projected growth over the next 20 to 40 years (Council of Fresno County Governments 2010b; Kern Council of Governments 2010b; Kings County Association of Governments 2010; Tulare County Association of Governments 2010).

1.2.4.2 Safety and Reliability

The following includes boilerplate text and directions for inserting information specific to the HSR section.

Projected growth in California's people and goods movement by automobile, air, and rail over the next two decades also underscores the need for improved travel safety. With more vehicles on intercity highways, the potential for accidents increases. Travel demand will continue to outpace future highway capacity, resulting in increased travel delays. Roadway congestion, limited airport capacity, passenger train delays from freight train traffic, and a growing intercity travel market adversely affect the travel time reliability of air, conventional passenger rail, and automobile travel. Weather-related events are an additional source of disruption and delay that affect transportation reliability and safety. As noted previously (under Travel Demand), [restate Caltrans conclusion regarding ability of state highways serving HSR section region to handle increased travel demand]. Many causes of increased highway congestion rates exist all over California. For example, accidents, road work, cars stranded along the roadside, or a routine traffic violation stop can create a bottleneck, potentially delaying commuters for miles. Poor

weather conditions (rain, wind, and dense fog) also adversely affect the reliability of highway travel times. Rain and wind can make the roads dangerously slick, increasing accident rates. Fog, haze, and glare at times can distract drivers or cause them to slow. As delay on the freeway increases, the overall reliability of the system tends to decrease (Cambridge Systematics, Inc. 2007).

The California Highway Patrol publishes an annual summary of accident data for state highways. According to those statistics, in 2008, 3,401 fatalities and 170,496 nonfatal injuries occurred on California highways, which correspond to a fatality rate of 1.04 per 100 million VMT (California Highway Patrol 2008).[insert fatality information specific to state highways in HSR section counties as compared to statewide average using information from California Highway Patrol 2010; Caltrans 2010] The nationwide fatality rate per 100 million VMT was 2.10 in rural areas and 0.80 in urban areas in 2008 (BTS n.d.).

Insert a paragraph that describes any particular weather conditions in the HSR section region that create a safety hazard for motorists. Identify any effects on travel patterns and modes from these conditions.

Weather conditions are also a key factor in airport flight delays. Some airlines adjust their schedules to achieve on-time arrivals even if departures are delayed; some airlines have increased their scheduled flight times between high-demand city pairs, such as Los Angeles and San Francisco, to maintain their on-time arrival statistics in the face of potentially increasing delays. Weather also results in flight cancellations. Aircraft delays cost the airlines and the traveling public time and money, and the FAA has identified the reduction of airport delays nationwide as one of its highest priorities. Data from the U.S. Department of Transportation Air Travel Consumer Report show San Francisco and Los Angeles international airports ranking among the worst of major airports in the country in terms of delay (U.S. Department of Transportation 2003). [Identify percentage of flights delayed at regional airports serving HSR section region] Airport delays are a function of capacity, weather conditions, and safety conditions. When demand at an airport exceeds the capacity on the airfield at that time, flights are delayed until they can be safely accommodated. Delayed flights sometimes compound problems for other flights and can result in cancelled flights. Because the FAA Ground Delay Program holds flights at their point of departure until the destination airport can accept the demand, and because short flights (e.g., [example of a short flight in area]) are more easily adjusted than longer flights (e.g., the East Coast or Midwest to the West Coast), short flights are more likely to experience holding delays. Consequently, intercity air travel within California can experience major delays because of the total airport demand.

1.2.4.3 Modal Connections

For this discussion provide the following information:

- Describe the major transportation facilities for passenger travel in the HSR Section region.
- Describe how highway (private auto and bus), air, and rail function to provide connectivity in the region.
- Identify the options available for connecting the HSR Section region to the larger metropolitan areas in the state.

1.2.4.4 Air Quality and Greenhouse Gas Emissions

The following includes boilerplate text and directions for providing information specific to the HSR section.

USEPA implements the Clean Air Act (CAA, 42 U.S.C. § 7401), as amended. Under the authority of the CAA, USEPA established nationwide air quality standards to protect public health and welfare with an adequate margin of safety. The federal standards (National Ambient Air Quality Standards (NAAQS)) represent the maximum allowable atmospheric concentrations for ozone

(O_3), particulate matter (particulate matter smaller than or equal to 10 microns in diameter (PM_{10}) and particulate matter smaller than or equal to 2.5 microns in diameter ($PM_{2.5}$)), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead. The CAA defines nonattainment areas as geographic regions designated as not meeting one or more of the NAAQS. The CAA requires that a state implementation plan (SIP) be prepared for each nonattainment area and a maintenance plan be prepared for each former nonattainment area that subsequently demonstrates compliance with the standards. A SIP is a compilation of a state's air quality control plans and rules that the USEPA has approved.

California has multiple air basins designated as nonattainment areas (see Section 3.3, Air Quality and Global Climate Change) ranging from severe to serious status, including the Sacramento Valley Air Basin, the San Joaquin Valley Air Basin, the South Coast Air Basin, and the Southeast Desert Air Basin (Coachella Valley).

Metropolitan areas will continue to be challenged to reduce emissions to acceptable levels from a growing number of vehicles and to maintain air quality standards by encouraging more efficient use of land resources, improving mobility, and providing alternative transportation facilities and services. Policies aimed at reducing the demand for trips in single-occupant vehicles are integral to all transportation plans and programs to help areas currently in nonattainment status to conform to federal air quality standards.

One statewide strategy adopted in the California SIP is the development of multi-use transportation corridors. Among them, they include designated lanes for high-occupancy vehicles (HOV), the addition of more transit, and the inclusion of rail modal options. Meeting federal and state air quality standards over the next 20 to 40 years will also require reductions in the VMT, integration of land use and transportation planning and development, development of transportation demand strategies, implementation of operational improvements, and use of new technologies that improve transportation efficiencies and increase transportation alternatives to the single-occupant automobile. Without the HSR System, auto trips are expected to account for more than 95 percent of all intercity travel and close to 90 percent of longer intercity trips in California by 2035.

In 2005, California set statewide targets for reducing greenhouse gas (GHG) emissions. Executive Order S-3-05 requires that state agencies reduce their GHG emissions to 2000 levels by the year 2010, to 1990 levels by the year 2020, and 80 percent below 1990 levels by the year 2050. Shortly after the issuance of Executive Order S-3-05, the California State Legislature adopted Assembly Bill (AB) 32, the Global Warming Solutions Act of 2006. AB 32 recognizes that California is the source of substantial amounts of GHG emissions. Legislative findings in the law state the following:

> *The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to the marine ecosystems and that natural environment, and an increase in the incidences of infectious diseases, asthma, and other health-related problems.*

To avoid these consequences, AB 32 requires the California Air Resources Board (CARB), the state agency charged with regulating air quality, to create a plan and implement rules to achieve *real, quantifiable, cost-effective reductions of greenhouse gases* in California. AB 32 requires CARB to design and implement emissions limits, regulations, and other measures to reduce statewide GHG emissions to 1990 levels by 2020. This plan was developed by CARB in 2008 as the Climate Change Scoping Plan (CARB 2008), the state's road map to reaching the GHG reduction goals required by AB 32. The Plan supports the implementation of a High-Speed Rail System to provide more mobility choice and reduce GHG emissions. The *Approved Scoping Plan*

was adopted by CARB at its December 11, 2008, meeting. The measures in this Scoping Plan will be developed and in place by 2012.

Senate Bill (SB) 375, which became law in September 2008, provides a new planning process to coordinate the community development and land use planning process with RTPs. SB 375 sets priorities to help California meet GHG reduction goals and requires the RTPs prepared by MPOs (including the COGS for [names of counties]) to include a "sustainable communities strategy" or, if infeasible, an "alternative planning strategy" that would support the GHG emission reduction targets for automobiles and light trucks set by CARB. The current provisional GHG reduction targets for the [identify region % reduction targets for 2020 and 2035].

The transportation sector is responsible for about 40 percent of California's GHG emissions (CARB 2010). Emissions of criteria pollutants (CO, lead, NO_2, PM, ozone, and SO_2) and GHG emissions from motor vehicles are directly proportional to the amount of fuel burned. [Insert federal and state exceedence information for applicable air basin] The projected population growth (see Section 3.19, Regional Growth) in the [project area] will result in an increase in VMT (see Section 3.2, Transportation) and the volume of pollutants emitted by motor vehicles. PM levels are a direct function of the amount of driving, with road dust caused by moving vehicles accounting for 60 to 80 percent of particulate emissions from mobile sources. Motor vehicle exhaust is a major source of fine particulates and the precursors to ozone. The continued increase in traffic will exacerbate the existing air quality problem and impede the region's ability to attain state and federal ambient air quality standards. Because emissions are directly proportional to the amount of fuel burned, offering effective transportation choices that can reduce driving will be critical for reducing these emissions.

Compared with travel by car, with its internal combustion engine, an electric-powered HSR System would reduce CO_2 emissions; an HSR trip from [section name] would save [###] pounds of CO_2 for each car making the same trip. The HSR System would also provide a more energy-efficient travel mode. A trip on the HSR System would use one-third the energy of a similar trip by air and one-fifth the energy of a trip made by car (California Office of the Governor 2007).

1.2.4.5 Protection and Preservation of Natural Resources and Agricultural Lands

The following includes boilerplate text and directions for providing information specific to the HSR section.

California's natural resources, including wetlands and waterways, habitat areas for sensitive species of plants and animals, and wildlife migration corridors have been subject to direct and indirect impacts as the state's population has increased and growth has occurred in the less developed areas of the state. [Describe the impact of development within the HSR section region on natural resources and agricultural lands]

In California, new development has consumed an acre of land for every 9.4 people statewide, but in the [project area], this rate is an acre for every [###] persons (Thompson 2009). Conversion of open lands has also led to inefficient urban development patterns that have resulted in increased cost for providing public services to the newly developed areas. Population growth in the [project area] in the coming decades is expected to continue, resulting in an ongoing pressure to use [identify land types that would be converted] lands to accommodate growth. The HSR System would ease the pressure on the state's [agricultural, if applicable] and open space by reducing the need for expanding airports and freeways. By offering a new transportation option, it provides an opportunity to create transit centers in the central business districts, where mixed land uses (residential, commercial, and business uses) and urban densities are best suited. Multimodal centers draw high volumes of people to interact for pleasure, business, and commerce purposes. The presence of high volumes of people can induce economic investments within walkable distances of these centers. Worldwide and national examples demonstrate increased land values adjacent to large multimodal centers to develop more densely around stations. If the communities zone to take advantage of this increase in land values, the growth

can be redirected to limit low density development, which has been consuming large amounts of land area. There is an opportunity to encourage walkable, more concentrated development patterns to meet new growth demands and reduce the rate and occurrence of low density, which erodes the valuable land resources.

1.3 Relationship to Other Agency Plans, Policies, and Program

The objectives of the California HSR System include providing an interface between the HSR System and major commercial airports, mass transit, and the highway network. Plans and programs that have been considered in the development of the [section name] Section alignment and station location options, or that already include recommendations for an HSR project, are discussed below.

Describe any relevant regional transportation, corridor, blueprint, and airport plans.

1.4 Relationship to Other Transportation Projects in the Study Area

The objectives of the proposed HSR System include interfaces between the HSR System and major commercial airports, mass transit, and the highway network. Other key transportation projects within the [section name] Section area that offer intercity travel benefits and could enhance intermodal connections to the proposed HSR System are described below. These projects have been considered in the planning and development of the [section name] Section and station location options.

Describe plans, programs and other measures that will affect or support the HSR system.

1.5 Tiering of Program EIR/EIS Documents

The following text from the *Fresno to Bakersfield Section Final EIR/EIS* can be used to introduce the discussion tiering EIR/EIS documents.

Since 2000, the Authority and FRA have been using a tiered environmental review process for the proposed HSR System. The "tiering" of environmental documents means addressing a broad, general program in an initial "programmatic" or first-tier environmental document, then analyzing the complete details of related projects in subsequent "project" or second-tier documents. The environmental documents for individual, second-tier projects may incorporate by reference analyses already completed in the first-tier document to address many large-scale, non-site-specific resources and issues while focusing the second-tier analysis on site-specific effects not previously considered. The tiering of environmental documents avoids repetitive evaluations of issues that were sufficiently addressed in a first-tier analysis and allows the second-tier analysis to focus on issues ripe for decision at the second tier.

The Statewide Program EIR/EIS (Authority and FRA 2005) provided a programmatic analysis of implementing the HSR System across the state, from Sacramento in the north to San Diego in the south and the San Francisco Bay Area to the west. At the conclusion of that first-tier environmental process, the Authority and FRA made the following decisions: selected the high-speed train alternative over no project or expanded freeways and airports (the modal alternative) to meet California's growing intercity transportation needs; selected high-speed steel-wheel-on-steel-rail train technology; selected corridor alignments and station locations for most of the Statewide HSR System to analyze further in second-tier EIR/EIS documents; and adopted programmatic mitigation strategies to carry forward into the second-tier analysis. Figure 1-6 shows the corridor alignments and station locations the Authority and FRA selected in 2005, at the conclusion of the Statewide Program EIR/EIS process. The 2005 decisions covered the geographic area discussed in the [section name] Section project-level EIR/EIS. Neither the FRA's nor the Authority's 2005 decisions were subject to legal challenge.

After the completion of the Statewide Program EIR/EIS document in 2005, the Authority and FRA then prepared a second program EIR/EIS for the HSR System to identify a corridor alignment and the station locations for the connection between the Bay Area and the Central Valley. At the conclusion of the 2008 Bay Area to Central Valley HSR Program EIR/EIS process, the Authority and FRA selected a Pacheco Pass connection, corridor alignments, and station locations for further second-tier evaluation. As a result of CEQA litigation, the Authority rescinded its 2008 programmatic decision, prepared a Revised Final Program EIR, and made a new decision on the Bay Area to Central Valley route in 2010. A second legal challenge resulted in the Authority preparing a Partially Revised Final Program EIR in 2012. The Authority certified the Partially Revised Final Program EIR in April 2012 and again selected a Pacheco Pass connection, corridor alignments, and station locations for second-tier evaluation. Figure 1-6 shows the corridor alignments and station locations for the entire statewide system, based on the FRA's 2008 decision and the Authority's 2012 decision.

These first-tier decisions established the broad framework for the HSR System that has shaped the scope of issues and project elements ripe for consideration and decision at the second tier. This project-level EIR/EIS is based on the train technology and vehicle types selected at the conclusion of the first-tier process.

Describe the general components of the HSR project to be evaluated in the project-level EIR/EIS. Example text from the *Fresno to Bakersfield Section Final EIR/EIS* is provided below.

> *This project-level EIR/EIS evaluates 11 alignment alternatives, further considering the corridor selected in the first-tier environmental process. This EIR/EIS also provides information about the locations within the Fresno to Bakersfield Section where an HMF for the HSR System could be built and operated. However, a decision on the HMF location will not be made at the same time as approval of the Fresno to Bakersfield alignment. The HMF location will be selected after considering the HMF sites identified in the San Jose to Merced Section EIR/EIS, the Merced to Fresno Section EIR/EIS, and the Fresno to Bakersfield Section EIR/EIS. Section 2.3 of this EIR/EIS, Potential Alternatives Considered during Alternatives Screening Process, discusses the reasons for making this decision at a later time. Many mitigation strategies adopted at the first tier have been incorporated directly into the second-tier project description as project design features, while other mitigation strategies have been refined and applied as specific mitigation measures.*
>
> *The second-tier Fresno to Bakersfield Section HSR project is consistent with the Authority and FRA's first-tier program decisions. The Fresno to Bakersfield Section would serve as the connection to Merced to the north and Palmdale and the Los Angeles Basin to the south. This Fresno to Bakersfield Section Project EIR/EIS tiers from the first-tier program EIR/EIS documents, which provide background information on the Statewide HSR Project, describe how the project has evolved to date, and explain how the Fresno to Bakersfield Section fits within the Statewide HSR System. Specifically, this second-tier Project EIR/EIS contains detailed analysis of the environmental impacts of implementing the Fresno to Bakersfield Section of the HSR System, including the alternatives to this section's alignment; the direct and indirect impacts of the alternatives, the cumulative impacts, the secondary effects, and the mitigation measures. Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Measures, examines the site-specific effects of implementing the HSR System in the Fresno to Bakersfield Section for each resource area. Consequently, it contains all the necessary site-specific environmental analysis to support the decision to proceed with the Fresno to Bakersfield Section HSR project.*

Figure 1-6 Program Alignments and Stations—State of California

Describe the process leading to certification and ROD for the Final EIR/EIS.

The second-tier [section name] Section EIR/EIS project is consistent with the Authority and FRA's first tier program decisions. The [section name] Section would serve as a connection to [city name] in the north and [city name] to the south. This [section name] Section Project EIR/EIS tiers from the first-tier program EIR/EIS documents, which provide background information on the Statewide HSR Project, describe how the project has evolved to date, and explain how the [section name] Section fits within the Statewide HSR System. Specifically, this second-tier Project EIR/EIS contains detailed analysis of the environmental impacts of implementing the [section

name] Section of the HSR System, including the alternatives to this section's alignment; the direct and indirect impacts of the alternatives, the cumulative impacts, the secondary effects, and the mitigation measures. Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Measures, examines the site-specific effects of implementing the HSR System in the [section name] Section for each resource area and does not rely on the prior first-tier documents to identify any environmental impact issues. In this sense, the [section name] Section Project EIR/EIS is tiered, but it is also a stand-alone document because it contains all the necessary site-specific environmental analysis to support the decision to proceed with the [section name] Section HSR project.

1.6 Revised 2012 Business Plan and 2014 Business Plan

In April 2012, the Authority adopted the Revised 2012 Business Plan for the California HSR System (Authority 2012b), reflecting a more detailed vision for how the Authority would deliver a high-speed train system for California over time. The purpose of the Authority's Business Plan is to comply with the requirements of California Public Utilities Code Section 185033, which requires the Authority to prepare, adopt, and submit a Business Plan to the Legislature every two years.

The 2014 Business Plan was adopted in April 2014 and submitted to the Legislature on May 1, 2014. The 2014 Business Plan describes the same phased implementation strategy included in the Revised 2012 Business Plan. The following discussion refers to the "2012 and 2014 Business Plans" or simply "Business Plans" except where it is necessary to distinguish between the two plans, and can be adapted for use in EIR/EIS documents. This content must be updated after adoption of successive Business Plans on even years after 2014.

1.6.1 Summary of Phased Implementation Strategy in 2012 and 2014 Business Plans

The 2012 and 2014 Business Plans are planning documents that describe an implementation strategy for the HSR System, including a phased approach for the construction and operation of the system. The 2012 and 2014 Business Plans depict general HSR routes consistent with the Statewide HSR System that the Authority and FRA selected in the CEQA and NEPA compliance analyses in the first-tier documents (i.e., the Statewide Program EIR/EIS (Authority and FRA 2005), the Final Bay Area to Central Valley Program EIR/EIS (Authority and FRA 2008), and the Partially Revised Final Bay Area to Central Valley Program EIR (Authority 2012)). The Business Plans are also consistent with the routes and facilities discussed in the Merced to Fresno and Fresno to Bakersfield second-tier environmental documents. The 2012 and 2014 Business Plans feature a detailed description of the anticipated phasing of the implementation of each individual section of the HSR System, including the order of construction of the project sections. Key elements of the 2012 and 2014 Business Plans' phased implementation strategy include:

- **Blending** the HSR System with improvements to existing rail systems on shared infrastructure to accelerate and broaden benefits, improve efficiency, minimize community impacts, and reduce construction costs while enhancing rail service for travelers throughout the state.
- Make **early investments** in the "bookends" (i.e., the San Francisco Bay Area and the Los Angeles Basin regions) to upgrade existing facilities and services, build ridership, and lay the foundation for expansion of the HSR System.
- Delivering **early benefits** to Californians by using and leveraging investments as they are made.

What Does "Blended" Mean?

The Business Plans refer to blended systems and blended operations. These terms refer to integrating the HSR System with existing intercity and commuter and regional rail systems through coordinated infrastructure (blended systems) and scheduling, ticketing, and other means (blended operations).

Phased Construction

The phased implementation strategy for delivery of the Statewide HSR System described in the 2012 and 2014 Business Plans anticipates constructing the 800+mile Statewide HSR System incrementally over time, as illustrated in Figure 1-7. Construction will start in the Central Valley with the Merced to Fresno and Fresno to Bakersfield Sections—called the initial operating segment (IOS) first construction (also known as the first construction section (FCS)), while making concurrent investments in the bookends, including electrification of the Caltrain corridor and investments in the Metrolink corridor between Los Angeles and Palmdale. High-speed train construction will continue to the south, building incrementally toward the Los Angeles Basin and its population centers with the Bakersfield to Palmdale Section and the Palmdale to Los Angeles Section—called the IOS. Construction will then connect to the San Francisco Bay Area with the San Jose to Merced Section—establishing a "Bay to Basin" high-speed rail system, and then the San Francisco to San Jose Section and the Los Angeles to Anaheim Section to complete the Phase 1 system. The more detailed discussion of the implementation of Phase 1 recognizes current budgetary and funding realities, which will result in both Phase 1 and Phase 2 (Phase 2 includes Los Angeles to San Diego and Merced to Sacramento) being constructed over a longer period of time than anticipated in previous Business Plans.

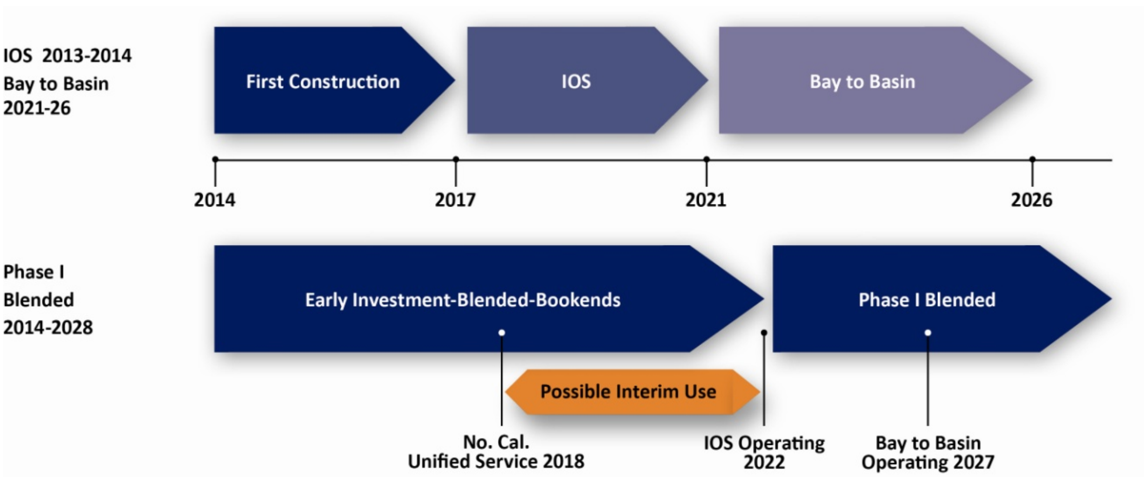


Figure 1-7 Phasing Approach

Interim Operations

As part of the emphasis on achieving early benefits for the traveling public, the 2012 and 2014 Business Plans identify that the FCS could provide interim travel benefits under circumstances where full high-speed train operations on the IOS were substantially delayed beyond the phased implementation schedule. The FCS may allow for the introduction of improved service for a portion of the Amtrak San Joaquin intercity rail service on an interim basis using the civil and track infrastructure analyzed in the Fresno to Bakersfield Final EIR/EIS as additional construction continues to the south. The Authority continues to work with the California State Transportation Agency and the Federal Railroad Administration "…to evaluate the potential for interim service… consistent with the principle that each program phase can stand alone and have independent utility." [6]

[6] 2014 California High-Speed Rail Business Plan, page 22

Phased Operations beyond First Construction Section

An initial priority of high-speed rail fund investments is to expedite the connection of the northern and southern parts of the state by establishing new rail service in the gap between Bakersfield and Palmdale. The new infrastructure connection will support an IOS with HSRs operating at 220 mph on a 300-mile segment, including trains and systems, between the Central Valley and the San Fernando Valley in 2022. By 2027, the Phase 1 Bay to Basin service will connect San Jose, the Central Valley, and Los Angeles/Anaheim on a 410-mile system through a combination of dedicated high-speed rail infrastructure blended with improvements to existing regional systems. The completed Phase 1 system will be operational in 2029 on 520 miles of track; the Phase 1 system will blend operations with existing commuter/intercity rail and incorporate additional improvements for a one-seat ride between Downtown San Francisco and Los Angeles/Anaheim. The Phase 2 expansion will bring high-speed rail to Sacramento, San Diego, and the Inland Empire.

1.6.2 Relationship of Business Plans to the [section name] Section EIR/EIS

The HSR System described in the 2012 and 2014 Business Plans is consistent with the HSR System described in the [section name] Section EIR/EIS. The general routes, station options, and technology are the same. The phased implementation strategy described in the Business Plans does not change the "full system" for the HSR in the [location] as defined and analyzed in the [section name] Section EIR/EIS. The [section name] Section will be constructed in the near term to the ultimate design of [summarize predominant guideway configuration for HSR section, such as two mainline tracks with four tracks at stations] and will meet all performance objectives identified in Chapter 2, Alternatives. The phasing assumptions for the [section name] Section would not alter the construction impacts outlined in the EIR/EIS.

The 2012 and 2014 Business Plans also describe the phasing strategy for initiating HSR service and integrating HSR service with intercity rail services as an initial step for HSR operations. The [section name] Section EIR/EIS assumes that HSR service will be operational for Phase 1, which will connect San Francisco with Los Angeles via the Central Valley by 2029, and Phase 2, which will subsequently extend service to Sacramento and San Diego. The Phase 1 system analysis for the EIR/EIS is based on a future year of 2040. The IOS first construction will be begin initial service in 2022. The Phase 1 build-out will be operational in 2029, and the full system operation (Phase 2) will occur after the 2040 Phase 1 system operations envisioned in the [section name] Section EIR/EIS.

Discuss the correspondence between the operational impacts and benefits expected by the Business Plan and the operational impacts and benefits presented in the EIR/EIS. For most HSR section EIR/EIS documents prepared after 2014, the most recent Business Plan will be the source of system, operation, and service plan information, ridership and other forecast data, which will lead to similar operational impacts and benefits. Some HSR projects may require a supplemental or subsequent EIR/EIS to a project EIR/EIS that used information from a previous Business Plan. Or, the preparation of an HSR section EIR/EIS may extend across more than one Business Plan cycle. In these cases, such as the following example from the *Fresno to Bakersfield EIR/EIS* (April 2014), explain variation, if any, between Business Plan operational estimates and EIR/EIS analyses.

> *The operational impacts of the HSR System would be expected to be lower under the 2012 and 2014 Business Plans in 2022 and 2029 and for full utilization of the Phase 1 system in 2040, than the levels presented in this EIR/EIS. Impacts would be lower than those identified in this EIR/EIS because fewer trains are expected to be operational before 2040 under the 2012 and 2014 Business Plans than assumed in the EIR/EIS. With fewer trains operating, the expected ridership under the 2012 and 2014 Business Plans would be lower and impacts, such as traffic and noise, associated with the train operations in 2040 would generally be*

less than the impacts presented in this EIR/EIS. Similarly, the benefits accruing to the project (e.g., reduced VMT, reduced GHG emissions, reduced energy consumption) would be less than the benefits presented in this EIR/EIS (see Appendix 1-A). As with the impacts, the benefits would continue to build and accrue over time and would eventually reach the levels discussed in this EIR/EIS for the Phase 1 system. A specific time frame has not been set for the implementation of Phase 2; that time frame will depend on funding availability and direction from the Board of Directors of the California High-Speed Rail Authority.

1.7 Products

The RC is responsible for preparing the following products, under Authority and FRA direction, according to PMT guidance and subject to PMT quality control and assurance.

1.7.1 Project EIR/EIS Volume 1

1. Summary for EIR/EIS Executive Summary
2. Purpose and Need Chapter for the EIR/EIS

1.8 Chapter 1—Purpose, Need, and Objectives EIR/EIS Outline

The RC shall use the following outline for organizing Chapter 1, Project Purpose, Need, and Objectives, of the project EIR/EIS, using the heading hierarchy and format as indicated.

Chapter 1 Project Purpose, Need, and Objectives
1.1 Introduction
- 1.1.1 The High-Speed Rail System
- 1.1.2 The (Section Name) HSR Project
- 1.1.3 The HSR Environmental Review Process
- 1.1.4 Lead Agencies, Cooperating Agencies, Responsible Agencies
- 1.1.5 Consistency with Federal Transportation Policy

1.2 Purpose of and Need for the HSR System and the (insert name) Section
- 1.2.1 Purpose of HSR System
- 1.2.2 Purpose of the (name of section) HSR Project
- 1.2.3 CEQA Project Objectives of the HSR System in California and in (name project section area)
- 1.2.4 Statewide and Regional Need for the HSR System in the (name of section) Section
  - 1.2.4.1 Travel Demand and Capacity Constraints
  - 1.2.4.2 Safety and Reliability
  - 1.2.4.3 Modal Connections
  - 1.2.4.4 Air Quality and Greenhouse Gas Emissions
  - 1.2.4.5 Protection and Preservation of Natural Resources and Agricultural Lands

1.3 Relationship to Other Agency Plans, Policies, and Program
- 1.3.1 Names of policies, plans, and programs

1.4 Relationship to Other Transportation Projects in the Study Area
- 1.4.1 Names of other projects in the study area

1.5 Tiering of Program EIR/EIS Documents

1.6 Revised 2012 and 2014 Business Plan
- 1.6.1 Summary of Phased Implementation Strategy in 2012 and 2014 Business Plans
- 1.6.2 Relationship of Business Plans to Fresno to Bakersfield EIR/EIS

2 ALTERNATIVES

This chapter provides background for the high-speed rail (HSR) project and describes the development, evaluation, screening, and selection of project alternatives for analysis in the environmental impact report/environmental impact statement (EIR/EIS). The methodology is based on the alternatives chapter in the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014). **Extensive examples selected from that chapter are the core of practical guidance and readily usable content in the methodology.**

Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as applicable, into appropriate areas within the chapter. Example text that illustrates the concepts and methods is shown in *italics*. The methods follow the general sequence of content in Chapter 2 of the EIR/EIS and use the same format scheme for headings, text, and tables as the EIR/EIS.

EIR/EIS Alternatives Design Acceptance Decision

Under California High-Speed Rail Authority (Authority) direction, the HSR Regional Consultant (RC) shall prepare materials, coordinate, conduct, and record the Authority and Program Management Team (PMT) acceptance of, and concurrence with, the description and design of HSR build alternatives for use in preparing the Draft EIR/EIS. The objectives of this formal decision are to ensure:

- Consistency with Authority-approved engineering, construction, operations, and maintenance requirements
- Consistency with Authority-approved guidance and criteria for design
- Appropriate geographic area required to determine the significance of direct and indirect impacts, permanent and temporary impacts, beneficial and adverse impacts of HSR improvements and activities, and non-HSR physical changes that are required for HSR implementation
- Adequate area to determine potential indirect impacts of implementing mitigation measures
- Adequate area to implement, operate, or maintain mitigation measures for off-site mitigation actions and mitigation sites (including relocations)

Following the receipt of U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency (USEPA) concurrence on National Environmental Policy Act (NEPA)/Clean Water Act Section 404/Rivers and Harbors Act Section 408 Integration (NEPA/404/408 Integration) Checkpoint B (Range of Alternatives) for the HSR section, the RC will complete draft preliminary design plans[1] and project description for use in preparing the Draft EIR/EIS. The RC will prepare the Administrative Draft EIR/EIS Chapter 2 Alternatives (including the project description) and submit with the draft preliminary design plans for Authority and PMT review. The review will be conducted by the Authority and PMT engineering, right-of-way, and environmental staff. The review will consider, in part:

- Completeness and adequacy of the proposed project footprint for completing the EIR/EIS and environmental regulatory processes that are based upon information and actions associated with the EIR/EIS

[1] Preliminary design for environmental documentation and permitting is at approximately 15% complete or the greater level of completeness adequate to conclude all environmental impact analyses and documents; prepare applications and acquire regulatory permits.

- Sufficient project footprint and range of alternatives to encompass anticipated identification of a preferred alternative and least environmentally damaging practicable alternative (LEDPA)
- Sufficient project footprint to accommodate project refinement through final design and specification for construction documents

The RC will subsequently address Authority and PMT comments, prepare a final version of the preliminary plans, project description, and Administrative Draft Chapter 2 and submit the final preliminary plans and Administrative Draft Chapter 2 to the Authority and PMT for final administrative review, acceptance, and concurrence signatures. Once the signature process is completed, the RC can then proceed with environmental evaluation and documentation for the Draft EIR/EIS using the approved project footprint and project description. Final administrative acceptance of, and concurrence with, the approved project description, design, and footprint of the EIR/EIS build alternatives shall suspend all activities associated with preliminary project design which could alter the project footprint, accentuate environmental impacts evaluated in the Draft EIR/EIS, or lead to environmental impacts that were not evaluated in the Draft EIR/EIS.

2.1 Introduction

The following text from the *Fresno to Bakersfield Section Final EIR/EIS* can be tailored for the Introduction to Chapter 2.

This chapter describes the background and development of the HSR system and its individual components. This chapter also describes the background and development and details of the alternatives considered for the [section name] Section of the HSR system. [Specify the number] of the alternatives discussed in this chapter are based on the alternatives selected by the Authority and Federal Railroad Administration (FRA) at the conclusion of the Tier 1 EIR/EIS processes for the HSR system (see Section 1.5, Tiering of Program EIR/EIS Documents). [Specify the number] of the alternatives were developed by conceptualization, analysis and screening, and interagency concurrence through the NEPA/404/408 Integration process. [Specify the number] additional alternatives were developed based on substantive comments received during public and agency review of the Draft EIR/EIS. The design drawings that support the alternatives' descriptions are included as Volume 3 (Alignments and Other Plans) of the EIR/EIS. This [Draft/Final] EIR/EIS analyzes the environmental impacts of implementing the [section name] Section of the HSR system, including alternatives, direct and indirect impacts, cumulative impacts, indirect effects, and mitigation measures. Visit the Authority website (www.hsr.ca.gov) to view and download the EIR/EIS, request a CD-ROM EIR/EIS, or locate a library to review a printed copy of the environmental document. Printed copies of the EIR/EIS have been placed in public libraries in the following cities and communities: Sacramento, [list cities/communities within the HSR Section]. The following documents are also available at the Authority's website: alternative analyses preceding preparation of the Project EIR/EIS, materials prepared for coordination with USACE and USEPA in compliance with Clean Water Act Section 404(b)(1) requirements, and technical reports developed for the environmental analyses presented in Chapter 3.

2.2 Background

2.2.1 California High-Speed Rail System Background

The following content from the *Fresno to Bakersfield Section Final EIR/EIS* can be used to introduce the Background section.

The planning, design, construction, and operation of the California HSR System are the responsibility of the Authority, a state governing board formed in 1996. The Authority's statutory mandate is to develop an HSR system that is coordinated with the state's existing transportation network, which includes intercity rail and bus lines, regional commuter rail lines, urban rail and

bus transit lines, highways, and airports. The Authority's plans call for high-speed intercity train service on more than 800 miles of tracks throughout California, connecting the major population centers of Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego (Figure 2-1).[2]

Figure 2-1 California HSR System

[2] The alignments on Figure 2-1 are based on Authority/FRA decisions made in the 2005, 2008, and 2012 Programmatic EIR/EIS documents.

The California HSR System is planned to be implemented in two phases. Phase 1 would connect San Francisco to Los Angeles and Anaheim via the Pacheco Pass and the Central Valley.[3] Phase 2 would connect from the Central Valley (Merced Station) to the state's capital, Sacramento, and another extension is planned from Los Angeles to San Diego (Figure 2-1). The HSR system would meet the requirements of Proposition 1A, including the requirement for a maximum nonstop service travel time between San Francisco and Los Angeles of 2 hours and 40 minutes.

2.2.2 [section name] Section EIR/EIS Background

The following text from the *Fresno to Bakersfield Section Final EIR/EIS* can be adapted for the EIR/EIS Background.

The [section name] Section would be a critical link in the Phase 1 HSR system connecting San Francisco and the Bay Area to Los Angeles and Anaheim. The Authority and FRA relied on program EIR/EIS documents (see Section 1.5, Tiering of Program EIR/EIS Documents) to select the [Program-level Selected Corridor Alternative for HSR Section] route for further study between [HSR Section terminal cities]. Therefore, the Project EIR/EIS for the [section name] Section focuses on alternative alignments [along/to] the general [Program-level Preferred Alternative/route] corridor.

The Authority and FRA circulated the Draft EIR/EIS for the [section name] Section to affected local jurisdictions, state and federal agencies, tribes, community organizations, other interest groups, and interested individuals for 60 days from [month day] to [month day, year].

For Draft EIR/EIS publication, summarize scoping and other relevant outreach in a manner similar to the previous example.

2.3 HSR System Infrastructure

The following content derived from the *Fresno to Bakersfield Section Final EIR/EIS* can be adapted to describe the HSR system Infrastructure.

The following section provides general information about the performance criteria, infrastructure components and systems, and function of the proposed HSR system as a whole. Detailed information on each alternative in the [section name] Section is provided in Section 2.4, including alignment, station location, and maintenance facility location alternatives. The HSR system is envisioned as a state-of-the-art, electrically powered, high-speed, steel-wheel-on-steel-rail technology, which would employ the latest technology, safety, signaling, and automated train control (ATC) systems. The trains would be capable of operating at speeds of up to 220 mph over fully grade-separated, dedicated track.

The infrastructure and systems of the HSR alternatives are composed of trains (rolling stock), tracks, stations, train control, power systems, and maintenance facilities. The design of each HSR alternative includes a double-track rail system to accommodate planned project operational needs for high-capacity rail movement. Additionally, the HSR safety criteria recommend avoidance of at-grade intersections on dedicated HSR alignments and, therefore, the system must be grade-separated from any other transportation system. This means that planning the HSR system would also require grade-separated overcrossings or undercrossings for roadways or roadway closures and modifications to existing systems that do not span planned right-of-way. In some situations, it would be more efficient for the HSR project to be elevated over existing facilities.

[3] Phase 1 may be constructed in smaller operational segments, depending on available funds.

2.3.1 System Design Performance, Safety, and Security

The proposed California HSR System has been designed for optimal performance and to conform to industry standards and federal and state safety regulations (Table 2-1). The HSR system would be a fully grade-separated and access-controlled [or partially grade-separated and limited-access for sections with blended systems/operations] guideway with intrusion detection and monitoring systems where required. This means that the HSR infrastructure (e.g., mainline tracks and maintenance and storage facilities) would be designed to prevent access by unauthorized vehicles, persons, animals, and objects. The capital cost estimates, presented in Chapter 6 of this [Draft/Final] EIR/EIS, include allowances for appropriate barriers (fences and walls), state-of-the-art communication, access-control, and monitoring and detection systems. Not only would the guideway be designed to keep persons, animals, and obstructions off the tracks, the ends of the HSR trainsets would include a collision response management system to minimize the effects of a collision. All aspects of the HSR system would conform to the latest federal requirements regarding transportation security. The HSR trainsets (train cars) would be pressure-sealed to maintain passenger comfort regardless of aerodynamic change, much like an airplane body does. Additional information regarding system safety and security is provided in Section 3.11 of this EIR/EIS.

Table 2-1 HSR Performance Criteria

Category	Criteria
System design criteria	▪ Electric propulsion system ▪ Fully grade-separated guideway [or partially grade-separated for sections with blended systems/operations] ▪ Fully access-controlled guideway with intrusion monitoring systems where required [or limited-access for sections with blended systems/operations] ▪ Track geometry to maintain passenger comfort criteria (smoothness of ride, lateral or vertical acceleration less than 0.1 g (i.e., acceleration due to gravity))
System capabilities	▪ Capable of traveling from San Francisco to Los Angeles in approximately 2 hours and 40 minutes ▪ All-weather/all-season operation ▪ Capable of sustained vertical gradient of 2.5 percent without considerable degradation in performance ▪ Capable of operating parcel and special freight service as a secondary use ▪ Capable of safe, comfortable, and efficient operation at speeds over 200 mph ▪ Capable of maintaining operations at 3-minute headways ▪ Equipped with high-capacity and redundant communications systems capable of supporting fully automatic train control
System capacity	▪ Fully dual track mainline with off-line station stopping tracks [or mixed track configuration for sections with blended systems/operations] ▪ Capable of accommodating a wide range of passenger demand (up to 20,000 passengers per hour per direction) ▪ Capable of accommodating normal maintenance activities without disruption to daily operations
Level of service	▪ Capable of accommodating a wide range of service types (express, semi-express/limited stop, and local)

HSR operation would follow safety and security plans developed by the Authority in cooperation with FRA to include the following:

- A System Safety Program Plan (SSPP), including a Safety and Security Certification Program, which would be developed during the preliminary engineering phase and refined during final design and construction phases to address safety, security, and emergency response as it relates to the day-to-day operation of the system.
- A Threat and Vulnerability Assessment for security and a Preliminary Hazard Analysis and Vehicle Hazard Analysis for safety, which would be developed during the preliminary engineering phase to produce comprehensive design criteria for safety and security requirements mandated by local, state, or federal regulations and industry best practices.
- A Fire Life Safety Program and a System Security Plan, which would be developed during the preliminary engineering phase. Under federal and state guidelines and criteria, the Fire Life Safety Plan would address the safety of passengers and employees as it relates to emergency response. The System Security Plan would address design features of the project intended to maintain security at the stations, within the trackwork right-of-way, and onboard trains. Compliance with these measures would maximize the safety and security of passengers and employees of the HSR project so that adverse safety and security impacts would be less than significant.

Design criteria would address FRA safety standards and requirements as well as a possible Petition for Rule of Particular Applicability that addresses specifications for key design elements for the system. FRA is currently developing safety requirements for HSRs for use in the U.S. FRA will require that the HSR safety regulations be met prior to revenue service operations. The following section describes those system components pertinent to the [section name] Section.

2.3.2 Vehicles

Although the exact vehicle-type has not yet been selected, the environmental analyses considered the impacts associated with any of the HSR vehicles produced in the world that meet the Authority's criteria. All of the world's HSR systems in operation today use electric propulsion with power supplied by an overhead system. These include, among many others, the Train à Grande Vitesse in France, the Shinkansen in Japan and Taiwan, and the InterCity Express in Germany. See Figure 2-2 for examples of typical HSRs.

Figure 2-2 Examples of Japanese Shinkansen high-speed trains

The Authority is considering an electric multiple unit concept that would equip several train cars (including both end cars) with traction motors compared to a locomotive-hauled train (i.e., one engine in the front and one in the rear). Each train car would have an active suspension and each powered car would have an independent regenerative braking system (which returns power to the power system). The body would be made of lightweight but strong materials and would have an aerodynamic shape to minimize air resistance, much like a curved airplane body.

A typical train would be 9 to 11 feet wide, consisting of two trainsets, each approximately 660 feet long and consisting of eight cars. A train of two trainsets would seat up to 1,000 passengers and be approximately 1,320 feet long with 16 cars. The power would be distributed to each train car via the overhead contact system (which is a series of wires strung above the tracks) and through a pair of pantographs that reach like antennae above the train (Figure 2-3). Each trainset would have a train control system that could be independently monitored with override control while also communicating with the systemwide Operations Control Center. Phase 1 HSR service is expected to need up to 94 sets of trains in 2035, depending on the HSR fares charged.

Figure 2-3 Example of an at-grade profile showing contact wire system and vertical arms of the pantograph power pickups

2.3.3 Station Site(s)

The design of the station areas would provide intermodal connectivity, drop-off facilities, an entry plaza, a station house area for ticketing and support services, an indoor station room where passengers wait and access the HSR, and parking facilities. Station design has not progressed beyond the conceptual stage. Figure 2-4 shows examples of station components from existing systems overseas; Figure 2-5 shows a potential "functional" station and a plan view of various station components. The functional station is a basic design that could be more elaborate with cooperation from the local jurisdiction; the station has the potential to be an iconic building that would help define the downtown transit core. Preliminary station planning and design are based on dimensional data from Station Platform Geometric Design guidance (Authority 2008), volumetric data from Station Program Design Guidelines (Authority 2009), and incorporate the Authority's *Urban Design Guidelines* (Authority 2011). [section name] All stations would be designed in accordance with Americans with Disabilities Act accessibility guidelines. The [section name] Section would include a station in [name HSR station cities]. The Authority is also considering a potential station location in the [name HSR station locale] area, the [station name] Station.

Station Parking Facilities

Parking demand estimates are based on HSR system ridership forecasts that assume, initially, parking availability is unconstrained—meaning 100% of parking demand is assumed to be met. These projections provide a "high" starting point to inform discussions with cities where stations are proposed. Based on a constraints analysis undertaken in consultation with station-cities, this Project EIR/EIS identifies locations for parking facilities needed to satisfy the maximum forecast constrained demand. Station access facilities are anticipated to be developed over time in phases, while also prioritizing access to the HSR system through modes such as transit, which could lead to lower parking demand. See HSR System Ridership and Station Area Parking in Section 2.6.3 for additional information.

Figure 2-4 Examples of Existing Stations

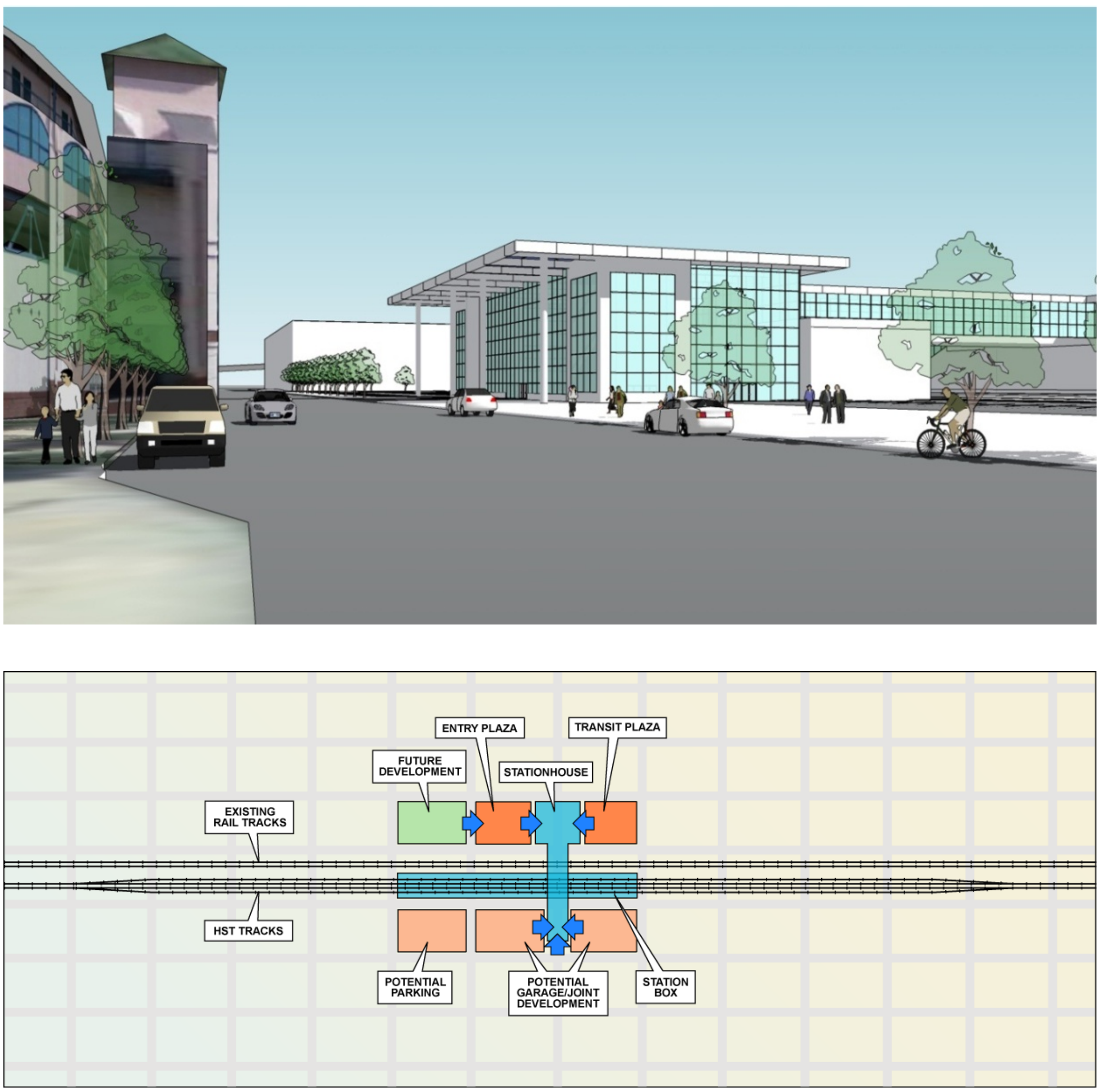


Figure 2-5 Simulated and plan views of a functional station and its various components

2.3.3.1 Station Platforms and Trackway (Station Box)

The station would provide a sheltered area and platforms for passenger waiting and circulation elements (stairs, elevators, escalators). Of the four tracks passing through the station, the two express tracks (for trains that do not stop at the station) would be separated from those that stop at the station and platforms. To allow enough distance for safe deceleration of trains, a platform track would diverge from each mainline track, beginning 3,000 feet from the center of the 1,410-foot station platform. The acceleration track from platform to mainline requires a shorter distance. An additional stub end refuge track would be provided to temporarily store HSR trains in case of mechanical difficulty, for special scheduling purposes, and for daytime storage of maintenance-of-way work trains during periods when structure and track maintenance is being performed along the line around the station. The combination of deceleration, acceleration, and refuge track extends the wider footprint of the four-track section up to a total distance of 6,000 feet.

2.3.3.2 Station Arrival/Departure Facility (Station House)

The station house would be adjacent to the primary entrance and plazas. The station house would be open to both patrons and visitors. Services within the station house may include initial ticketing and check-in, traveler's aid and local information services, and concessions. Circulation linkages between the station house and the station platforms may include hallways, an access bridge to cross over railroad tracks, stairs, escalators, elevators, and moving sidewalks.

2.3.4 Infrastructure Components

The dedicated, fully grade-separated [or blended, partially grade-separated, where applicable for HSR sections with blended operations] infrastructure needed to operate high-speed trains has more-stringent alignment requirements than those needed for lower-speed trains. In the [section name] Section, the HSR alternatives would use [###] different track profiles. These track types have varying profiles: low, near-the-ground tracks are at-grade; higher tracks are elevated or on retained fill (earth); and below-grade tracks are in a retained cut or tunnel. Types of bridges that might be built include full channel spans, large box culverts, or, for some wider river crossings, limited piers within the ordinary high-water channel. [Add description of tunnel types and typical sections, where applicable.] The various track profiles are described below.

2.3.4.1 At-Grade Profile

At-grade track profiles[4] (Figure 2-6) are best suited in areas where the ground is relatively flat, as in the Central Valley, and in rural areas where interference with local roadways is infrequent. The at-grade track would be built on compacted soil and ballast material (a thick bed of angular rock) to prevent subsidence or changes in the track surface from soil movement. To avoid potential disruption of service from floodwater, the rail would be constructed above the 100-year floodplain in rural areas or small communities or above the 200-year floodplain in urban or urbanizing areas. The height of the at-grade profile may vary to accommodate slight changes in topography, provide clearance for stormwater culverts and structures in order to allow water flow, and sometimes wildlife movement.

[4] Confer with the PMT to confirm the minimum applicable right-of-way section per TM 1.1.21 Typical Cross Sections. As of September 2013, the minimum right-of-way for the at-grade typical cross section is 130 feet.

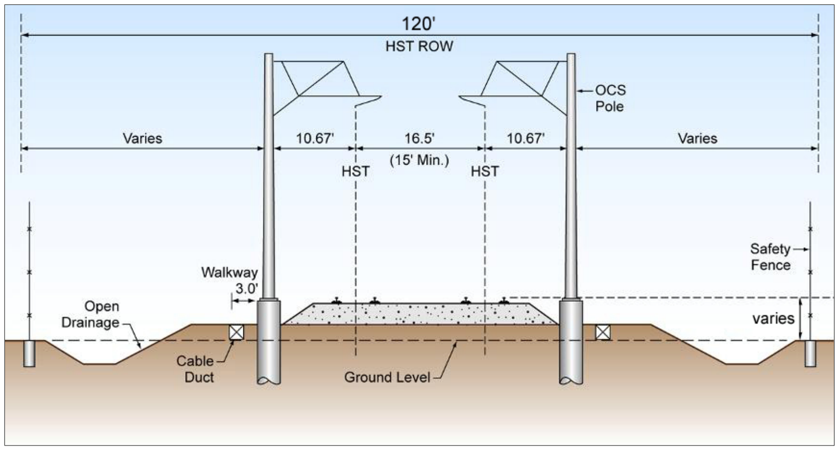


Figure 2-6 At-grade Typical Cross Section

2.3.4.2 Retained-Fill Profile

Retained-fill profiles[5] (Figure 2-7) are used when it is necessary to narrow the right-of-way within a constrained corridor to minimize property acquisition or to transition between at-grade and elevated profiles. The guideway would be raised off the existing ground on a retained fill platform made of reinforced walls, much like a freeway ramp. Short retaining walls would have a similar effect and would protect the adjacent properties from a slope extending beyond the rail guideway.

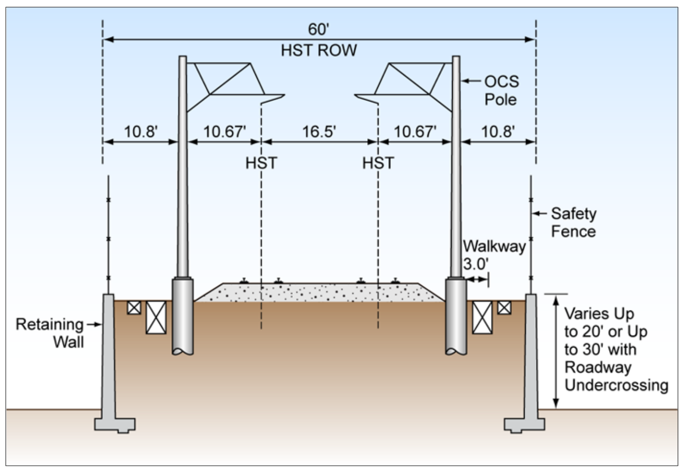


Figure 2-7 Retained-fill Typical Cross Section

2.3.4.3 Retained-Cut Profile

Retained-cut profiles[6] (Figure 2-8) are used when the rail alignment crosses under existing rail tracks, roads, or highways that are at-grade. This profile type is used only for short distances in highly urbanized and constrained situations. In some cases, it is less disruptive to the existing traffic network to depress the rail profile under these crossing roadways. Retaining walls would typically be needed to protect the adjacent properties from a cut

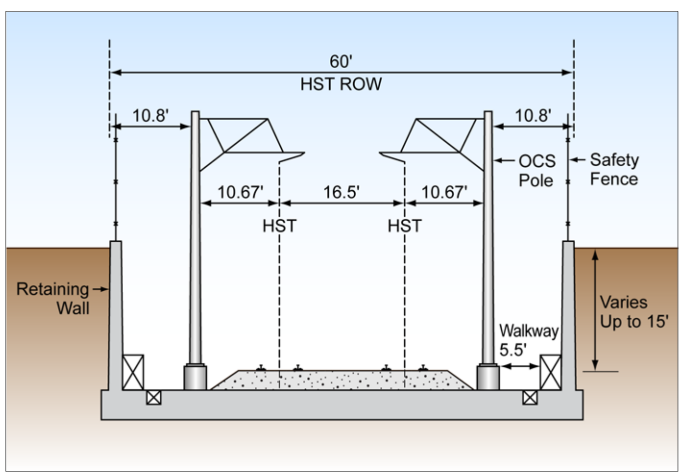


Figure 2-8 Retained-cut Typical Cross Section

[5] Confer with the PMT to confirm the minimum applicable right-of-way section per TM 1.1.21 Typical Cross Sections. As of September 2013, the minimum right-of-way for the retained-fill typical cross section is 80 feet.
[6] Confer with the PMT to confirm the minimum applicable right-of-way section per TM 1.1.21 Typical Cross Sections. As of September 2013, the minimum right-of-way for the retained-cut typical cross section is 80 feet.

slope extending beyond the rail guideway. Retained cut profiles are also used for roads or highways when it is more desirable to depress the roadway underneath an at-grade HSR alignment.

2.3.4.4 Tunnel Profile

Tunnel profiles (See Appendix A of *Typical Cross Sections for 15% Design, R1*)[7] are used when the rail alignment traverses highly variable topography or highly constrained, densely developed urban situations. Tunnel profiles reduce track distance and curvature needed to maintain acceptable vertical and horizontal grades in mountainous terrain. Tunnels may be used in dense urban settings to avoid land use or traffic disruptions.

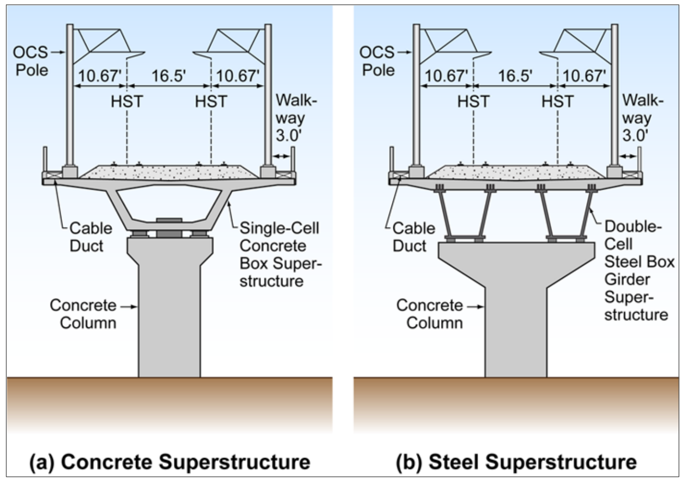


Figure 2-9 Elevated Structure Typical Cross Sections

2.3.4.5 Elevated Profile

Elevated profiles (Figure 2-9) can be used in urban areas where extensive road networks must be maintained. An elevated profile must have a minimum clearance of approximately 16.5 feet over roadways and approximately 24 feet over railroads. Pier supports are typically approximately 10 feet in diameter at the ground. Such structures could also be used to cross water bodies; even though the trackway might be at-grade on either side, the width of the water channel could require a bridge at the same level, which would be built in the same way as the elevated profile.

Straddle Bents

When the HSR elevated profile crosses over a roadway or railway on a very sharp skew (degree of difference from the perpendicular), a straddle bent ensures that the piers are outside of the functional/ operational limit of the roadway or railway.

As shown in Figure 2-10, a straddle bent is a pier structure that spans (or “straddles”) the functional/ operational limit of a roadway, highway, or railway. Typical roadway and highway crossings that have a

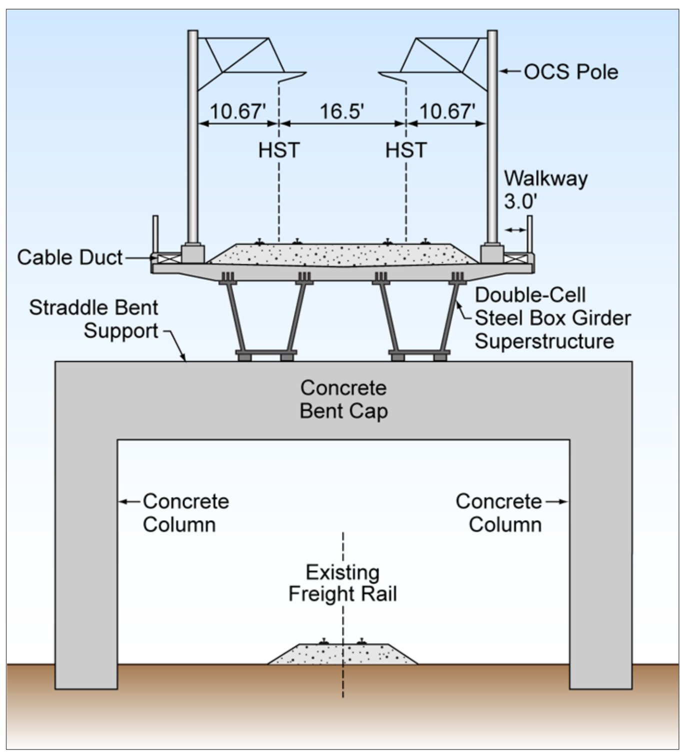


Figure 2-10 Straddle Bent Typical Cross Section

[7] On the Authority website, at www.hsr.ca.gov/docs/programs/eir_memos/Proj_Guidelines_TM1_1_21R00.pdf

smaller skew angle (i.e., the crossing is nearly perpendicular) generally use intermediate piers in medians and span the functional right-of-way. However, for larger-skew-angle crossing conditions, median piers would result in excessively long spans that are not feasible. Straddle bents that clear the functional right-of-way can be spaced as needed (typically 110 feet apart) to provide feasible span lengths for bridge crossings at larger skew angles.

2.3.5 Grade Separations

An optimal operating HSR system consists of a fully grade-separated and access-controlled guideway. Unlike existing passenger and freight trains in the project area, there would be no at-grade road crossings, nor would the HSR system share its rails with freight trains. [Modify this description where guideway is partially grade-separated for sections with blended systems/operations] The following list describes possible scenarios for HSR grade separations for roadways, irrigation and drainage facilities, and wildlife:

- **Elevated HSR road crossings**—In urban areas, it may be more feasible to raise the HSR as shown previously in Figure 2-9 and Figure 2-10. This is especially relevant in downtown urban areas where use of an elevated HSR guideway would minimize impacts on the existing roadway system.
- **Roadway overcrossings**—There are many local roadway and state route facilities that currently cross at-grade with or over the [freight railroad operator] railroad tracks. Where these frontage roads are impacted by the HSR alignment, they would be shifted and reconstructed to maintain their function. Figure 2-11 illustrates how a roadway would be grade-separated over both the HSR and the railroad in these situations. Similar conditions occur when an at-grade HSR alignment crosses rural roads used by small communities and farm operations. Where roads are perpendicular to the proposed HSR, overcrossings or undercrossings are planned every 2 miles to provide continued mobility for local residents and farm operations[, but may be provided at shorter intervals as warranted by existing roadway infrastructure]. Some roads may be closed in the intervals between grade-separated crossings. These modifications are identified on project maps and detailed lists are provided in Appendix 2-A. Figure 2-12 is an example of a typical roadway overcrossing of the HSR tracks. Overcrossings would have two lanes, each with a width of 12 feet. The shoulders would be 4 to 8 feet wide, depending on average daily traffic volumes. The paved surface for vehicles would therefore range from 32 to 40 feet wide. Minimum clearance would be 27 feet over the HSR. Specifications are based on county road standards.
- **Roadway undercrossings**—HSR alternatives may require undercrossings for the HSR to travel over roadways. Figure 2-13 illustrates how a roadway would be grade-separated below the HSR guideway.

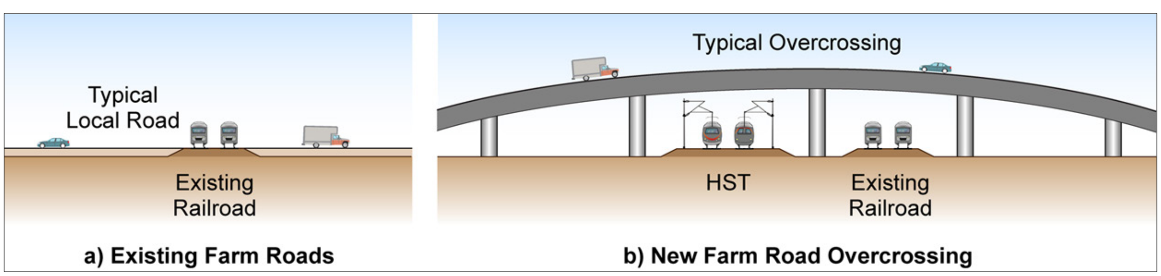


Figure 2-11 Replacing local at-grade crossings with new overcrossings above HSR guideway and existing railroad trackway

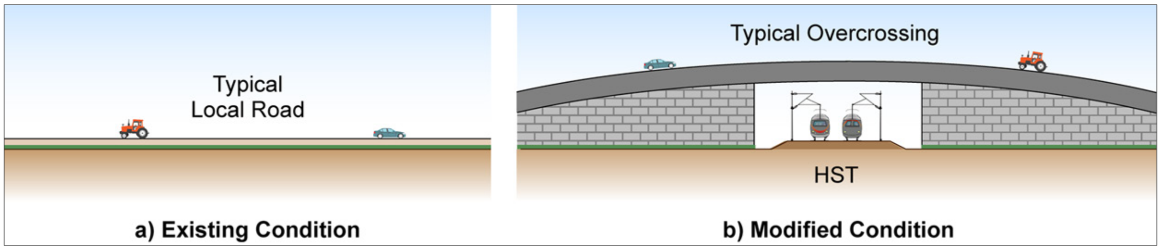


Figure 2-12 Adding Local Roadway Overcrossings above HSR Guideway

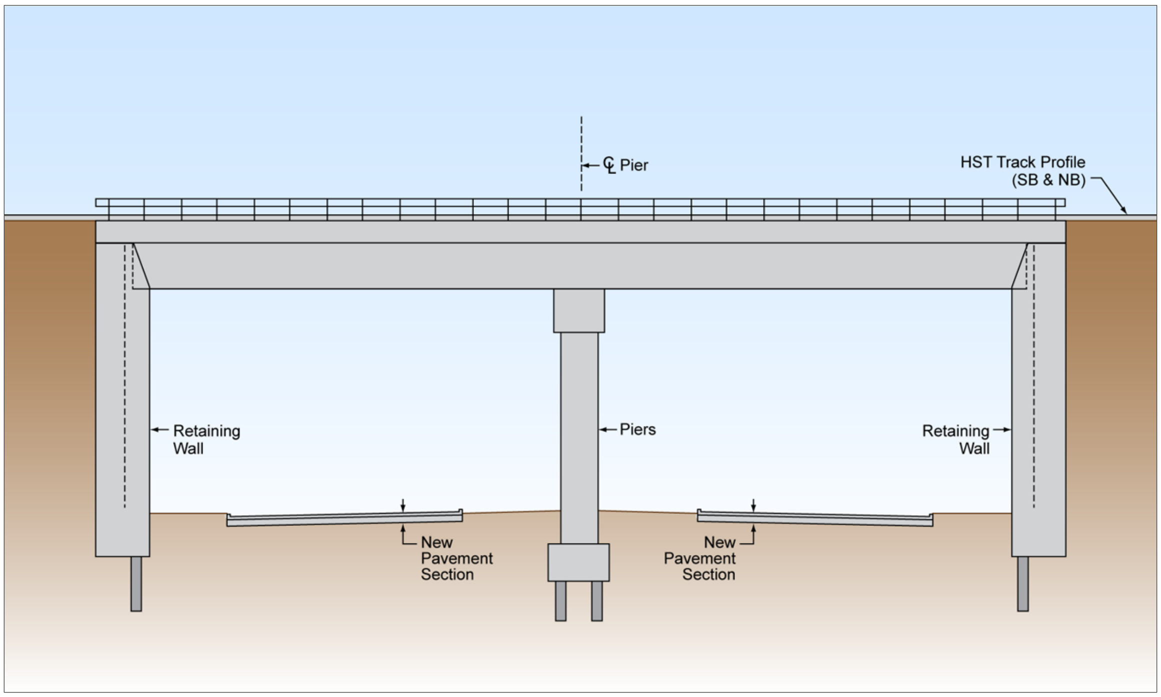


Figure 2-13 Typical Cross Section of Roadway Grade-separated beneath HSR Guideway

- **Irrigation and Drainage Facilities**—The HSR alignment would affect some existing drainage and irrigation facilities. Depending on the extent of the impact, existing facilities would be modified, improved, or replaced, as needed to maintain existing drainage and irrigation functions and support HSR drainage requirements.
- **Wildlife Crossing Structures**—Wildlife crossing opportunities would be available through a variety of engineered structures. In addition to dedicated wildlife crossing structures, wildlife crossing opportunities would also be available at elevated portions of the alignment, bridges over riparian corridors, road overcrossings and undercrossings, and drainage facilities (i.e., large diameter [specify diameter in inches] culverts and paired 30-inch culverts).

  Dedicated wildlife crossing structures would be provided from approximately [specify northern extent in HSR section] south to [specify southern extent in HSR section] in at-grade portions of the railroad embankment at approximately 0.3-mile intervals. Where bridges, aerial structures, and road crossings coincide with proposed dedicated wildlife crossing structures, such features would serve the function of, and supersede the need for, dedicated wildlife crossing structures. Project design plans will be further refined to identify optimal wildlife-friendly crossing locations to maintain or enhance crossing, dispersal, and migration opportunities for wildlife across the HSR alternatives.

The preliminary wildlife crossing structure design consists of modified culverts in the embankment that would support the HSR tracks. The typical culvert from end-to-end would be 73 feet long (crossing-structure distance), would span a width of approximately 10 feet (crossing-structure width), and provide 3 feet of vertical clearance (crossing-structure height), resulting in a calculated openness factor (Bremner-Harrison et al. 2007) of 0.41.8 to accommodate variations in the topography, the height of the at-grade profile may require depressing wildlife crossing structures no more than 1.5 feet (half of the vertical clearance) below-grade.

At locations where stormwater swales parallel the embankment, the approach to wildlife crossing structures would be designed in such a way as to minimize the amount of surface water runoff entering the structure. A small berm (or lip) would be constructed at the entrance of the wildlife structure to prevent water from entering during small storm events. Swales would be directed around this lip. To allow wildlife free passage through the crossing structures, HSR right-of-way fencing would be constructed at the toe of the slope, up the embankment, and around the entrance of the structure. At locations where an intrusion protection barrier[9] parallels a proposed wildlife crossing structure, the crossing structure would be extended and designed to pass through the barrier to allow wildlife free passage. Figure 2-14 shows the wildlife crossing elevation and cross section, as well as the drainage detail.

Additional wildlife crossing structure designs could include circular or elliptical pipe culverts, and larger (longer) culverts with crossing-structure distances of up to 100 feet. However, any changes to wildlife crossing structure design must be constrained by a minimum of 3 feet of vertical clearance (crossing-structure height), depressed no more than 1.5 feet below-grade (half of the vertical clearance), and must meet or exceed the minimum 0.41 openness factor.

Additionally, dedicated wildlife crossing structures would be placed to the north and south of each of the following river/creek crossings: [list creek, slough, and river crossings, as relevant for wildlife crossings]. These wildlife crossing structures would be located between 100 and 500 feet from the banks of each riparian corridor.

2.3.6 Traction Power Distribution

California's electricity grid would power the proposed HSR system. The HSR system is expected to require less than 1 percent of the state's future electricity consumption. In 2008, a study performed by Navigant Consulting, Inc. found that while the HSR would be supplied with energy from the California grid, it is not feasible to physically control the flow of electricity from particular sources (Navigant Consulting, Inc. 2008). However, it would be feasible for the Authority to obtain the quantity of power required for the HSR from 100 percent clean, renewable energy sources through a variety of mechanisms, such as paying a clean-energy premium for the electricity consumed.

The project would not include the construction of a separate power source, although it would include the extension of underground or overhead power transmission lines to a series of power substations positioned along the HSR corridor. These power substations are needed to even out the power feed to the train system. Working in coordination with power supply companies and per design requirements, the Authority and FRA have identified frequency and right-of-way requirements for these facilities.

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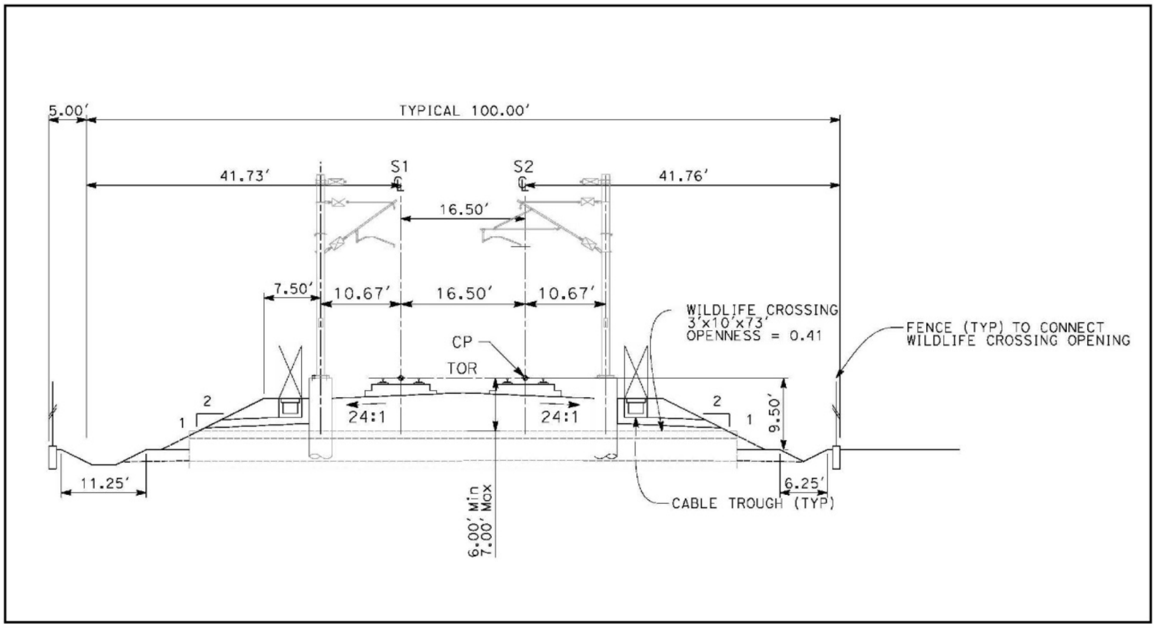
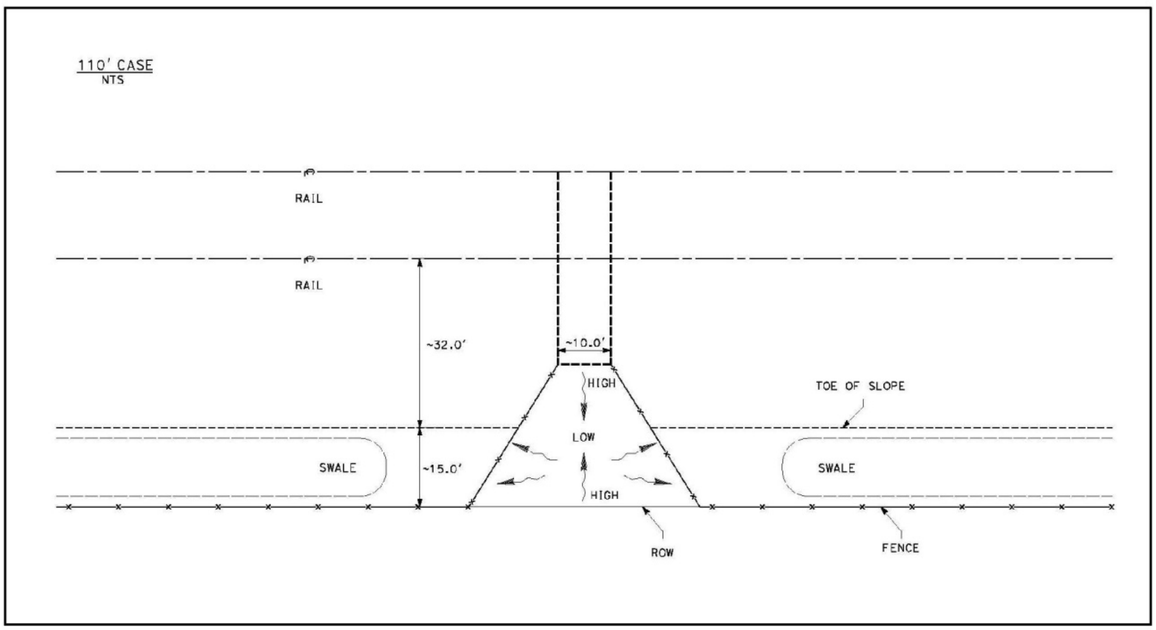
[8] (Height x Width)/Distance = Openness Factor; for example, (4 ft x 8 ft)/72 ft = 0.44

[9] The HSR cross sections include provisions for a 102-foot separation of the HSR track centerline from conventional rail systems to avoid intrusion without the need for any physical element for protection from rail cars operating on adjacent freight lines. In areas where it is not feasible to provide this separation distance, protection is required to prevent encroachment on the HSR right-of-way. Protection would consist of a swale, berm, or barrier (wall), depending on the separation.



a. Wildlife crossing elevation and cross section



b. Wildlife crossing drainage detail

Figure 2-14 Wildlife crossing structure (example only)

Trains would draw electric power from an overhead contact system with the running rails acting as the other conductor. The contact system would consist of a series of mast poles approximately 23.5 feet higher than the top of the rail, with contact wires suspended from the mast poles between 17 to 19 feet from the top of the rail. The train would have an arm, called a pantograph, to maintain contact with this wire to provide power to the train. The mast poles would be spaced approximately every 200 feet along straight portions of the track down to every 70 feet in tight-turn track areas. The contact system would be connected to the substations, required at

approximately 30-mile intervals. Statewide, the power supply would consist of a 2 by 25 kilovolt (kV) overhead contact system for all electrified portions of the statewide system. See Figure 2-3, which shows a typical overhead contact system.

2.3.6.1 Traction Power Substations

Based on the HSR system's estimated power needs, traction power substations (TPSS) would each need to be approximately 32,000 square feet (200 feet by 160 feet) and be located at approximately 30-mile intervals. Figure 2-15 shows a typical TPSS. Figure 2-16 shows a typical TPSS OCS feeder gantry.

TPSSs would have to accommodate the power substations and would require a buffer area around them for safety purposes. For the [section name] Section, electrical substations would be constructed at locations where high-voltage power lines cross the HSR alignment. The TPSS and associated feeder gantry could be screened from view with a perimeter wall or fence. Each TPSS site would have a 20-foot-wide access road (or easement) from the street access point to the protective fence perimeter at each parcel location. Each site would require a parcel of up to 2 acres. Each substation would include an approximately 450-square-foot control room (each alternative design includes these facilities, as appropriate).

Power would be supplied by [provider of electric power, such as Pacific Gas and Electric Company (PG&E) or Southern California Edison (SCE)] transmission lines. [PG&E/SCE] has indicated that existing lines may need to be reconstructed in order to serve the project. This could consist of reconductoring transmission lines, or new power poles may need to be installed. When electrification of the system is required, [PG&E/SCE] would design and implement changes to their transmission lines, including completion of environmental review and clearance of the reconstruction of transmission lines. If the engineering design for new or upgraded PG&E facilities involves new or different significant environmental impacts, additional environmental review and analysis of the new equipment, including reconstruction of transmission lines, will be completed as part of the California Public Utilities Commission permit application process prior to construction.

2.3.6.2 Switching and Paralleling Stations

Switching and paralleling stations work together to balance the electrical load between tracks, and to switch power off or on to either track in the event of an emergency. Switching stations (Figure 2-17) would be required at approximately 15-mile intervals, midway between the TPSSs. These stations would need to be approximately 9,600 square feet (120 feet by 80 feet).

Paralleling stations (Figure 2-18 and Figure 2-19) would be required at approximately 5-mile intervals between the switching stations and the TPSSs. The paralleling stations would need to be approximately 8,000 square feet (100 feet by 80 feet). Each station would include an approximately 450-square-foot (18 feet by 25 feet) control room.

The switching and paralleling stations and associated feeder gantries could be screened from view with a perimeter wall or fence. TPSS, traction power switching, and paralleling stations are included in each alternative design as appropriate.

Figure 2-15 Traction Power Substation

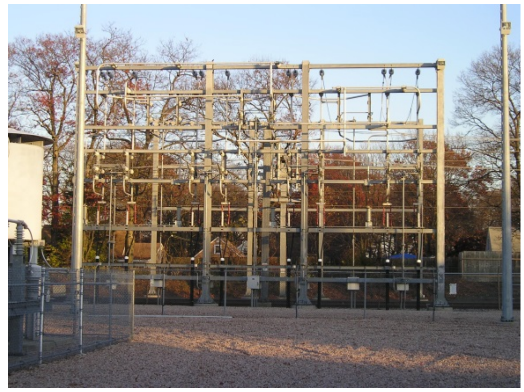


Figure 2-16 Traction Power Substation OCS Gantry

Figure 2-17 Switching Station

Figure 2-18 Paralleling Station

Figure 2-19 Paralleling Station OCS Gantry

2.3.6.3 Backup and Emergency Power Supply Sources for Stations and Facilities

During normal system operations, power would be provided by the local utility service or from the TPSS. Should the flow of power be interrupted, the system will automatically switch to a backup power source, through use of an emergency standby generator, an uninterruptable power supply, or a DC battery system.

For the [section name] Section, permanent emergency standby generators are anticipated to be located at passenger stations and at the heavy maintenance facility (HMF) *[HMF for Merced-Fresno and Fresno-Bakersfield Sections only]* and terminal layup/storage and maintenance facilities. These standby generators are required to be tested (typically once a month for a short duration) in accordance with National Fire Protection Association 110/111 to ensure their readiness for backup and emergency use. If needed, portable generators could also be transported to other trackside facilities to reduce the impact to system operations.

2.3.7 Signaling and Train-Control Elements

A computer-based, enhanced ATC system would control the trains. The enhanced ATC system would comply with the FRA-mandated positive train control requirements, including safe separation of trains, over-speed prevention, and work zone protection. This would use a radio-based communications network that would include a fiber optical backbone and communications towers at intervals of approximately 1.5 to 3 miles, depending on the terrain and selected radio frequency. Signaling and train control elements within the right-of-way would include 10-foot-by-8-foot communications shelters or signal huts/bungalows that house signal relay components and microprocessor components, cabling to the field hardware and track, signals, and switch machines on the track. Communications towers within these facilities would use a 6- to 8-foot-diameter, 100-foot-tall pole. The communications facilities would be located in the vicinity of track switches and would be grouped with other traction power, maintenance, station, and similar HSR facilities where possible. Where communications towers cannot be located with TPSSs or other HSR facilities, the communications facilities would be located near the HSR corridor in a fenced area of approximately 20 feet by 15 feet.

2.3.8 Track Structure

The track structure would consist of either a direct fixation system (with track, rail fasteners, and slab), or ballasted track, depending on local conditions and decisions to be made in later design. Ballasted track requires more frequent maintenance than slab track, as described below, but is less expensive to install.

For purposes of environmental review, slab track is assumed for long HSR structures and ballasted track is assumed for at-grade sections and short HSR structures. A subsequent environmental review will be performed if there is a significant change in the type of track structure following additional design and technical review.

2.3.9 Maintenance Facilities

The California HSR System includes three types of maintenance facilities. Each section would have maintenance-of-way facilities, and a number of overnight layover and servicing facilities would be distributed throughout the system. In addition, the HSR system would have a single HMF *[HMF for Merced-Fresno and Fresno-Bakersfield Sections only]*. Descriptions of each follow.

2.3.9.1 Maintenance-of-Way Facilities

Maintenance-of-way facilities provide for equipment, materials, and replacement parts storage and support quarters and staging areas for the HSR system subdivision maintenance personnel. Each subdivision would cover about 150 miles; the maintenance-of-way facility would be centrally located in the subdivision.

The facility would sit on a linear site adjacent to the HSR tracks with a maximum width of seven tracks, and would be approximately 0.75 mile long for a size between 28 and 38 acres. [###] maintenance-of-way [facility/facilities] would be necessary in the [section name] Section. This facility would be co-located with the HMF, if an HMF is provided in this project section. If an HMF is not provided

> **Maintenance-of-Way**
>
> A train industry term that refers to repair and maintenance activity concerning the right-of-way and track, including track and roadway, buildings, signals, and communication and power facilities.

in this project section, the maintenance-of-way facility would be located at one of the potential HMF sites identified in this EIR/EIS (see Section 2.5.5, Proposed Heavy-Maintenance Facility Locations) *[HMF for Merced to Fresno and Fresno to Bakersfield sections only]*. Additionally, for lengths of mainline track that are relatively distant from stations with refuge tracks or maintenance-of-way facilities, a refuge track would be sited to provide temporary storage of work trains as they perform maintenance in the vicinity of the track. The track would be approximately 1,600 feet long and would be connected to the main line. Access by road for work crews would be required, along with enough space to park work crew vans while working from the site and to drive the length of the track. The track and access area would be within the fenced and secure area of the HSR line. The [section name] Section would require a refuge track in the vicinity of [name locale of refuge track]. In April 2013, the Authority released an updated summary of requirements for project operations and maintenance facilities.[10] This operations and maintenance facilities memorandum describes requirements for project facilities for the phased implementation of the HSR System, updates facilities terminology, and informs the engineering design included in Volume 3 of this EIR/EIS. The memorandum introduces new facilities terminology, but does not introduce new facilities. For example, the maintenance-of-way facilities are now named "maintenance of infrastructure facilities" and the refuge track facility described above as being required in the vicinity of [name locale of refuge track] is now termed "maintenance of infrastructure siding". Refer to Appendix 2-E, Summary of Requirements for Operations and Maintenance Facilities.

2.3.9.2 HSR Heavy Maintenance Facility Sites

HSR HMF sites are considered within the Merced to Fresno and Fresno to Bakersfield HSR sections. This content may also affect the definition and evaluation of alternatives, and the environmental analyses of the adjacent Merced to Sacramento HSR section, the Central Valley Wye project, and will be the central feature of the HMF Project. The following content from the *Fresno to Bakersfield Section Final EIR/EIS* can be adapted for use in those three project studies.

An HSR heavy vehicle maintenance and layover facility would be sited in either the Merced to Fresno Section or Fresno to Bakersfield Section. This facility would require approximately 154 acres with space for all activities associated with train fleet assembly, disassembly, and complete rehabilitation; all onboard components of the trainsets; and overnight layover accommodations and servicing facilities. The site would include a maintenance shop, yard, Operations Control Center building, one TPSS, other support facilities, and a train interior cleaning platform. Figure 2-20 shows a conceptual HMF layout. The property boundaries for each HMF site would be larger than the acreage needed for the actual facility because of the unique site characteristics and constraints of each location.

The HMF would have two functions. First, it would support train arrival, assembly, testing, and commissioning to operations. Later, the HMF would become the HSR systemwide heavy maintenance workshop. The HMF is likely to support the following functions:

- **Assembly, Testing, and Commissioning**—During the pre-revenue service period, the HMF would be used for the assembly, testing, acceptance, and commissioning of the HSR system's new trains. Implementation of the testing, acceptance, and commissioning activities would require a mainline test track between 80 and 105 miles in length, connected directly to the HMF. This would also accommodate the equipment decommissioning or retirement of equipment from the system to make way for the future generations of trains.

[10] See Authority website, www.hsr.ca.gov/docs/programs/eir_memos/Summary_of_Reqs_for_OM_Facilities_130321.pdf

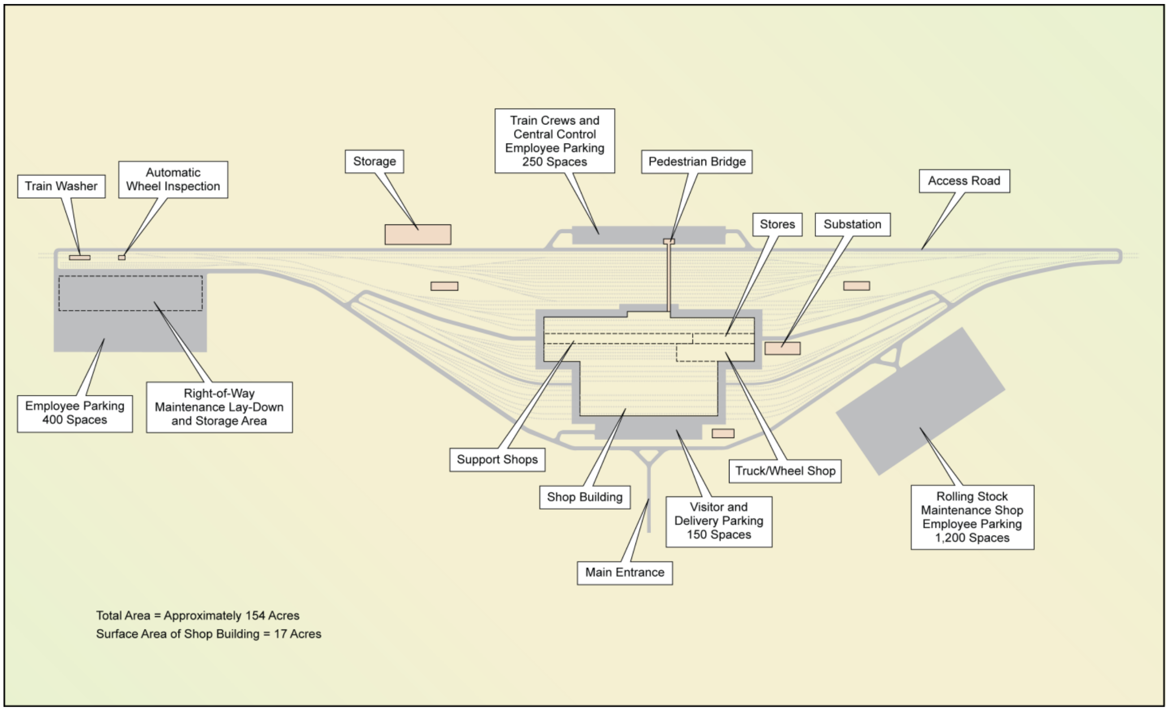


Figure 2-20 Conceptual HMF layout

- **Train Storage**—Some trains would be stored at the HMF prior to start of revenue service.
- **Service Monitoring**—Service monitoring would include daily train testing and diagnostics of certain safety sensitive apparatus on the train in addition to automatic on-board and on-ground monitoring devices.
- **Examinations in Service**—Examinations would include inspections, tests, verifications, and "quick" replacement of certain train components on the train. Examples include inspection and maintenance tasks associated with the train's pantographs and running gear, such as bogies and underbody elements.
- **Inspection**—Periodic inspections would be part of the planned preventive maintenance program requiring specialized equipment and facilities. Examples include examination of interior fittings and all train parts, passenger environment, in-depth inspection of axles and underbody components critical to train safety, and wheel condition diagnostics and re-profiling (wheel trueing).
- **Rolling Stock Modifications and Accident Repair**—Rolling stock modifications and accident repair would include major design modifications for improving safety, reliability, and passenger comfort.
- **Overhaul**—Part of planned life cycle maintenance program, overhauls require a specialized heavy maintenance shop with specific heavy-duty equipment. Activities would include the complete overhaul of train components. Overhauls may be completed on each trainset every 7 to 10 years (30-day duration per trainset).

The HMF would require approximately 154 acres, including buildings, outdoor service areas, storage, roadways, and parking. The proposed HMF sites are centrally located along the HSR system to accommodate direct connection with 80 to 105 miles of high-speed mainline test track for HSR fleet testing, acceptance, and commissioning. A single, gated entry would control access to the HMF. A two-way, 24-foot-wide circulation road would follow the facility's interior perimeter

and a 50-foot-wide asphalt apron would surround the main shop building to provide emergency vehicles access to the structure. Exterior lighting would be angled toward the ground to limit reflectance and light pollution/spillage outside the facility grounds, and would incorporate fixture hoods/shielding, cutoff angles, and minimum necessary brightness standards consistent with operational safety and security requirements. Where both physically feasible and operationally appropriate, HMF exterior lighting would also include the use of switches, timer switches, or motion detectors, as necessary, to minimize the duration of outdoor lighting.

About 1,200 to 1,500 employees could be accommodated during peak shifts, including overlapping personnel departures and arrivals. The HMF would require parking for approximately 1,200 vehicles based on an estimate of 80 percent automobile share; and assuming 20 percent of employees would use public transportation or ride-share. In addition, up to 150 parking spaces near the facility would be available for management and administrative personnel, visitors, deliveries, and parking. Some crew, rolling stock preparation personnel, and train yard employees would park their automobiles near the yard tracks. Thus, the plan would include spaces for approximately 50 crew, 50 rolling stock preparation personnel, and 150 yard support employees at full build-out.[11] A pedestrian bridge over the train yard tracks would connect the employee parking lot to the main shop building.

Operations Control Center

The HMF could house the Operations Control Center on the second floor and would provide space for employee parking, pedestrian access/egress, and appropriate bathroom and lunchroom facilities. Housing the Operations Control Center in the HMF would minimize costs and impacts because it would not increase the HMF's footprint or require a separate building. If not housed on the HMF site, the Operations Control Center would be housed in an office building where adequate and reliable electronic data are permitted for up to 200 employees.

2.3.9.3 Terminal Storage and Maintenance Facility

Terminal storage and maintenance facilities (TSMF) would be located at terminal stations to supply inspected and serviced trainsets at the beginning of each day of revenue service. The development of TSMFs is based upon implementation of the current phases of the HSR system. Changes in service plans and phasing may alter the development of TSMF sites. For example, an incremental phasing step toward the Initial Operating Segment (IOS) may operate a temporary terminus at Palmdale. In this case, a TSMF at Palmdale may not be needed if equipment could be maintained from the HMF, provided there were adequate storage tracks at the Palmdale terminus. Terminal station locations will evolve with build-out of the system operating service segments, as follows:

- Initial Operating Segment: San Fernando Valley
- Bay to Basin: San Jose (Gilroy) and San Fernando Valley
- Phase 1: San Francisco, San Jose (Gilroy), Palmdale, and Los Angeles (San Fernando)

Describe the TSMF type and configuration required in the HSR section, based upon information developed by the section design/engineering team. See the PMT Technical Memorandum *Summary of Requirements for O&M Facilities* [12] for a description of TSMF site sizes and dimensions, track layouts, storage and maintenance functionality and activities, and other operating characteristics.

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[11] The HMF would be built to meet the necessary requirements for rolling stock and a variety of maintenance activities needed. The entire site would be acquired, but the internal functions may be constructed over time.
[12] See Authority website, www.hsr.ca.gov/docs/programs/eir_memos/Summary_of_Reqs_for_OM_Facilities_130321.pdf. Pages 6 through 8.

2.4 Potential Alternatives Considered during Alternatives Screening Process

The following text derived from the *Fresno to Bakersfield Section Final EIR/EIS* can be tailored for the preamble to the alternatives screening description.

Following the decisions of the Program EIR/EIS documents (see Section 1.5, Tiering of Program EIR/EIS Documents), the Authority, in cooperation with FRA, began the environmental review process for the [section name] Section of the California HSR Project. The environmental review process includes a Notice of Intent and Notice of Preparation (published in [year]) and an agency and public scoping process. Public and agency comments received during the [section name] Section Project EIR/EIS scoping period and through interagency coordination meetings also informed the development of initial alternatives for the screening evaluation. Initial alternatives were developed and screened in coordination with the NEPA/404/408 Integration process. After analysts identified the initial group of potential alternatives, they developed alignment plans, preliminary profile concepts, and cross sections.

The Fresno to Bakersfield Section design criteria dictate 220-mph designs throughout, with few exceptions [section name]. The Fresno to Bakersfield Section is also one of two HSR sections with sites under consideration for the HMF [section name] where the HSRs would be assembled and tested [section name] The trains need to be tested for up to 2 years prior to operation [section name] The following summarizes the [section name] Section alternatives development and analysis process and results.

2.4.1 HSR Project-Level Alternatives Development Process

The purpose of the Alternatives Analysis is to determine a reasonable range of feasible HSR approaches that bound the range of potential environmental impacts for evaluation in the Draft EIR/EIS. Compose a manageable number of project alternatives based upon distinguishing characteristics or unifying frameworks. In addition to demonstrating a rational and coherent alternatives analysis, this approach will communicate policy themes of importance within the project segment in a way that is readily understandable by the public (e.g., minimizing impacts to prime agricultural lands, providing maximum opportunities for transit oriented development (TOD), locating within existing transportation corridors, avoiding community disruption) and enable meaningful consideration of policy and impact trade-offs. Assess the alternatives to be carried forward in the EIR/EIS against the project Purpose, Need, and Objectives and screen by the following characteristics (and other factors as appropriate):

- Travel time
- Route length
- Technical and legal feasibility
- Constructability
- Critical environmental, community, infrastructure, railroad[13] or regulatory factors/fatal flaws (see Crucial Project Definition Issues in Table 2-2)
- Right-of-way[14] and utility availability
- Capital, operating, and maintenance costs
- Support for transit

[13] At least one HSR project alternative must evaluate alignment(s) and facilities that do not involve those of a Class 1 railroad in the HSR section.

[14] Do **not** assume that the Authority will be able to acquire or use land or right-of-way owned by railroads, state or federal agencies. Land or right-of-way owned by religious, cultural, or educational entities must also be considered as a special constraint.

- Consistency with local, regional, and state plans and future growth areas
- Reasonable range of alternatives
- Unifying rationales/themes of primary importance within the project section

Once alternatives have been defined and evaluated in the Draft EIR/EIS, take the following factors into consideration for selecting the Preferred Alternative for the Final EIR/EIS:

- Environmental performance
- Decision criteria under Section 404(b)(1) of the Clean Water Act, notably inclusion of the LEDPA
- Minimization of critical factors
- Public and stakeholder input

Develop, analyze, and screen HSR project alternatives in accordance with the Authority Technical Memorandum *Alternatives Analysis Methods for Project EIR/EIS, Version 3*.[15] Coordinate alternative development, analysis, and screening with the NEPA/404/408 Integration Checkpoint B process and milestone.[16]

2.4.1.1 Project Definition Framework and Alternatives Development

HSR project definition begins with the corridor(s) and station locations selected by the Authority and FRA with the 2005 statewide Final Program EIR/EIS or the 2008 *Bay Area to Central Valley Final Program EIR/EIS* (as applicable) and concludes with identification of the preferred HSR project alternative. Project definition becomes increasingly complete, detailed, and collaborative to meet the analytical and decision-making needs at progressive stages of the California Environmental Quality Act (CEQA)/NEPA and NEPA/404/408 Integration processes. Develop information of sufficient type, detail, precision, and with adequate agency, stakeholder, landowner, and public engagement to achieve timely, efficient, and cost-effective project information at each process stage. Administer resources to minimize, to the extent feasible, investment in excess of process stage requirements or effort that does not contribute to subsequent stages in the process.

Figure 2-21 summarizes project definition during the development, screening, and selection of alternatives for consideration in the EIR/EIS.

[15] See Authority website, www.hsr.ca.gov/docs/programs/eir_memos/Proj_Guidelines_RevisAA_MethodsVer3.pdf

[16] On ProjectSolve, see the *Checklist for Practicability Analysis Under Clean Water Act Section 404(b) (1) and Associated Regulations* at https://WW3.projectsolve2.com/eRoom/SFOF/CAHSRProgramMgmt/0_e4c21 and the *Annotated Outline—Checkpoint B Summary Report* at https://WW3.projectsolve2.com/eRoom/SFOF/CAHSRProgramMgmt/0_e1178. Migration of guidance from ProjectSolve to SharePoint is on-going; check with PMT for current links to these documents. Also, see the most recent Checkpoint B document, such as the draft Checkpoint B Summary Report for San Jose to Merced Section or the Merced to Fresno Central Valley Wye.

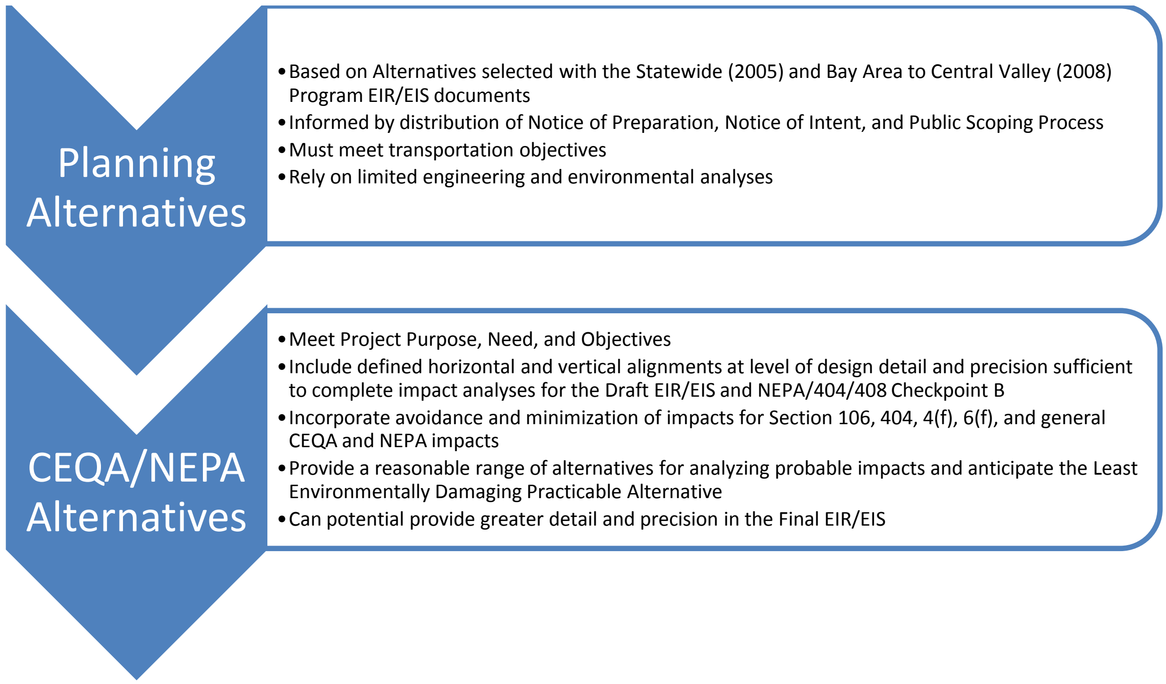

Figure 2-21 Project Definition

Table 2-2 provides a framework of progressive HSR project definition through the alternatives development and evaluation processes. The framework relates increasingly complete, detailed, and precise project description and project footprint with the coordinated stages of the EIR/EIS and NEPA/404/408 Integration processes, Authority guidance for project design and analysis, and participants and roles. The intent of this framework is to identify the levels of project information that are appropriate at different stages of environmental analysis, show the corresponding milestones of the two major environmental analysis processes, inventory applicable program and project guidance (Appendix A), and identify the type and range of stakeholder participation that is essential for successful progress through the environmental documentation and regulatory permitting processes.

2.4.1.2 Summary of HSR Project-Level Alternatives Development Process

Summarize the process of developing HSR project-level alternatives by describing:

- Requirements under CEQA and NEPA (cite sections) to consider a range of alternatives, including a No Project/No Action alternative, and include input of the public and interested resource agencies in the development of the reasonable range of alternatives
- Basic criteria for selecting the reasonable range of alternatives (i.e., meets project objectives/purpose and need, reduces one or more impacts, is potentially feasible and practicable) and note that a "reasonable range" does not include every conceivable alternative, yet is designed to bound the range of expected natural resource and community impacts
- Narrowing of the range of alternatives by the Statewide (2005) and Bay Area to Central Valley (2008) Program EIR/EISs and related records of decision (ROD)
- Devising and assessing potential alternatives, including the list of evaluation criteria

Table 2-2 Project Description: Definition Framework

EIR-EIS Milestones	Project Description and Footprint	NEPA/404/408 Integration Checkpoints	Authority Guidance[1] (see Appendix A)	Participants and Role[2] Project Team	Approval or Permitting Agencies	Consulting or Advising Agencies or Tribes	Regional or Local Agencies and Special Districts[3]
NOI/NOP	"Programmatic" description in general detail. Route, station cities, facility types at typical intervals. All desktop analysis with available information.	n.a.	TM 0.0a; 0.1; 0.4; 0.7; 0.9; 0.1.1; 1.1.1; 1.1.2; 1.1.5; 1.1.5.1; and 2.2.5	Design: RC with EMT oversight Authority and FRA with AG input Planning: RC with PMT oversight Environment: RC with PMT oversight			
Purpose, Need, Objectives		Checkpoint A					
PAA (Phase 1 done) (Phase 2 pending)	"Conceptual" design[4] at sufficient precision and detail to analyze fatal flaws associated with Crucial Project Definition Issues.[5] First definition of Project Footprint (PF), based upon typical specifications in Authority Technical Memoranda. All project components located in space, schematic placement of typical feature footprints. Iterative screening to refine and eliminate alternatives. All desktop analysis with available information.	Checkpoint B	TM 0.3; 0.4; 0.7; 1.1.4; 1.1.6; 1.1.8; 1.1.10; 1.1.18; 1.1.19; 1.1.21; 2.1.2; 2.1.3; 2.1.7; 2.1.8; 2.1.9; 2.2.2; 2.2.3; 2.2.4; 3.1.1.3; 3.2.1; 3.4.11; 4.2; 5.1; 5.3; and 6.1	Design: RC with EMT oversight Authority and FRA with AG input Planning: RC with PMT oversight Environment: RC with PMT oversight ROW: RC with Authority and PMT oversight	STB (FTA for blended) USACE, USEPA USFWS, NMFS CDFW CVFPB/DWR SWRCB, RWQCB CPUC U.S. DOC CCC, BCDC SHPO	FTA, FHWA, FAA USBR, BLM, USFS, NPS, U.S. DOD Caltrans Corrections Federal Tribes State Tribes	Local Governments MPOs/COGs AQMD LMAs or RDs Municipal Services Public Utilities General Public Freight Railroads Passenger Railroads Landowners in PF
SAA(s)	"Conceptual" design, refined with input from stakeholders and public.[4] Further screening to refine and narrow the range and number of alternatives for EIR/EIS analysis. Assure sufficient PF for "Preliminary" design of alternatives. Mostly desktop analysis with some early data on Existing Conditions.						
DEIR/DEIS	"Preliminary" design utilizing preliminary engineering for environmental analysis[6] to achieve sufficient precision and detail to complete all EIR/EIS and NEPA/404/408 analyses, and support all regulatory permit applications. Project Footprint at parcel-level precision, including all project components located in space, ROW and property acquisitions, utility relocations, roadway relocations, electrical power connections, construction activities and durations, TCE's, fully articulated assumptions for subsequent design solutions. Input from impact assessments. Field-verified existing conditions, as allowed by access.	n.a.	TM 2.3.2; 2.3.3; 2.4.2; 2.4.5; 2.4.6; 2.4.8; 2.5.1; 2.6.5; 2.6.7; 2.7.4; 2.7.5; 2.8.1; 2.8.2; 2.9.1; 2.9.2; 2.9.3; 2.9.6; 2.9.10; 2.10.5; 2.10.6; 2.10.10; 3.1.1.1; 3.1.3.1; 3.1.5.3; 3.2.2; 3.2.3; 3.2.6; 3.3.1; 3.3.2; 3.3.3; 3.3.4; 3.4.1; 3.4.2; 4.1; 4.1.1; 6.3; 7.3; and 1.1.18	Design: RC with EMT oversight Authority and FRA with AG input Planning: RC with PMT oversight Environment: RC with PMT oversight ROW: RC with Authority and PMT oversight CM: Authority and EMT/PMT	STB (FTA for blended) USACE, USEPA USFWS, NMFS CDFW CVFPB/DWR SWRCB, RWQCB CPUC U.S. DOC CCC, BCDC SHPO	FTA, FHWA, FAA USBR, BLM, USFS, NPS, U.S. DOD Caltrans CalFire Corrections Federal Tribes State Tribes	Local Governments MPOs/COGs AQMD LMAs or RDs Municipal Services Public Utilities General Public Freight Railroads Passenger Railroads Landowners in PF
ID Preferred Alternative	"Preliminary" design with refinements within range of DEIR/DEIS alternatives to minimize natural and community resource impacts, respond to public, agency, and stakeholder input on DEIR/DEIS, and implement Authority and FRA policies/objectives.	Checkpoint C LEDPA §404 Application §408 Major/Minor Determination	TM 1.1.22; 1.1.24; 2.7.5; and 2.10.4	Design: RC with EMT oversight Authority and FRA with AG input Planning: RC with PMT oversight Environment: RC with PMT oversight ROW: RC with Authority and PMT oversight CM: Authority and EMT/PMT	STB (FTA for blended) USACE, USEPA USFWS, NMFS CDFW, U.S. DOC CVFPB/DWR SWRCB, RWQCB CPUC CCC, BCDC SHPO	FTA, FHWA, FAA USBR, BLM, USFS, NPS, U.S. DOD Caltrans Corrections Federal Tribes State Tribes	Local Governments MPOs/COGs AQMD LMAs or RDs Municipal Services Public Utilities General Public Freight Railroads Passenger Railroads Landowners in PF
FEIR/FEIS		n.a.					

[1] See Appendix A for inventory of guidance as of June 2014. List is illustrative, not definitive or exclusive of applicable requirements. Guidance is cumulative, such that guidance indicated at earlier stages applies to later stages in project definition and design.

[2] Agency Roles: Agency role and jurisdiction may vary by HSR Project section, regulatory circumstances and resource conditions

[3] Public and private municipal services or public utilities entities

[4] Alternatives Analysis Methods, v.3, at www.hsr.ca.gov/docs/programs/eir_memos/Proj_Guidelines_RevisAA_MethodsVer3.pdf

[5] Crucial Project Definition Issues: Design information (speed, travel time, alignment, systems, facilities, O&M, etc.) to assess feasibility, practicability, constructability, and cost; Sections 4(f) and 6(f); Section 106; Local concerns; Sections 404 and 408; Environmental Justice; Purpose, Need, and Objectives; Section 7; Public Facilities; LEDPA; right-of-way; freight or passenger railroads

[6] 15% Design Scope TM, at www.hsr.ca.gov/docs/programs/eir_memos/TM_0_1_15_Design_Scope_R3_131224_no_sigs.pdf

AG = Attorney General
AQMD = Air Quality Management District
Authority = California High-Speed Rail Authority
BCDC = Bay Conservation and Development Commission
BLM = Bureau of Land Management
Cal-Fire = California Department of Forestry and Fire Protection
Caltrans = California Department of Transportation
CCC = California Coastal Commission
CDFW = California State Department of Fish and Wildlife
CDWR = California Department of Water Resources
CM = construction management
COG = Council of Governments
CPUC = California Public Utilities Commission
CVFPB = Central Valley Flood Protection Board
EIR = environmental impact report
EIS = environmental impact statement
EMT = Program Engineering Management Team
FHWA = Federal Highway Administration
FRA = Federal Railroad Administration
FTA = Federal Transit Administration
ID = identify
LEDPA = least environmentally damaging practicable alternative
LMA = levee maintaining agency
MPO = Metropolitan Planning Organization
NMFS = National Marine Fisheries Service
NOI/NOP = notice of intent/notice of preparation
NPS = U.S. National Parks Service
PAA = preliminary alternatives analysis
PF = project footprint
PMT = Program Management Team
RC = Regional Consultant
RD = reclamation district
ROW = right-of-way
RWQCB = Regional Water Quality Control Board
SAA = supplemental alternatives analysis
SHPO = State Historic Preservation Officer
STB = Surface Transportation Board
SWRCB = State Water Resources Control Board
TCE = temporary construction easement
TM = technical memorandum
U.S. DOC = U.S. Department of Commerce
U.S. DOD = U.S. Department of Defense
USACE = U.S. Army Corps of Engineers
USBR = U.S. Bureau of Reclamation
USEPA = U.S. Environmental Protection Agency
USFAA = Federal Aviation Administration
USFS = U.S. Forest Service
USFWS = U.S. Fish and Wildlife Service

The following text from the *Fresno to Bakersfield Section Final EIR/EIS* can be tailored to describe the project alternatives development process.

An EIR/EIS is required to analyze the potential impacts of the full range of reasonable alternatives (14 CCR 15126.6; 40 C.F.R. Part C.F.R. Part 1502.14(a)). Under CEQA, the alternatives are to include a No Project Alternative and a range of potentially feasible alternatives that would (1) meet most of the project's basic objectives and (2) avoid or substantially lessen one or more of the project's significant adverse effects (Cal. Code Regs., tit. 14, § 15126.6(c)). In determining the alternatives to be examined in the EIR, the lead agency must describe its reasons for excluding other potential alternatives. Under the "rule of reason," an EIR is required to study a sufficient range of alternatives in order to permit a reasoned choice (Cal. Code Regs., tit. 14, § 15126.6(f)). It is not required that all possible alternatives be studied.

Alternatives Analysis Reports Available for Public Review

The Alternatives Analysis, including the preliminary and supplemental reports, are available on-line at:

[insert www address on the Authority website]

Under NEPA, the alternatives analysis is "the heart of the environmental impact statement" (40 C.F.R. Part 1502.14). Accordingly, the EIR/EIS examines the range of reasonable alternatives to the proposed action, including the no-action alternative. Pursuant to Section 14(l) of the FRA's Procedures for Considering Environmental Impacts, these include "all reasonable alternative courses of action that could satisfy the [project's] purpose and need" (64 Fed. Reg. 28546). The Authority and FRA considered the input of the public and interested resource agencies when developing the reasonable range of alternatives. Pursuant to CEQA and NEPA, scoping meetings were held to invite public participation in defining the scope of the analysis, including the range of reasonable alternatives.

The development of project-level alternatives followed the process described in *Alternatives Analysis Methods for Project-Level EIR/EIS* ([citation]). The assessment of potential alternatives involved both qualitative and quantitative measures that address applicable policy and technical considerations. These included field inspections of corridors; project team input and review considering local issues that could affect alignments; qualitative assessment of constructability, accessibility, operations, maintenance, right-of-way, public infrastructure impacts, railway infrastructure impacts, and environmental impacts; engineering assessment of project length, travel time, and configuration of key features of the alignment, such as the presence of existing infrastructure; and geographic information system (GIS)-based analysis of impacts on farmland, water resources, wetlands, threatened and endangered species, cultural resources, current urban development, and infrastructure. Specific decision criteria under Section 404(b)(1) of the Clean Water Act include Consistency with project purpose; logistics and technology; impacts on aquatic resources; environmental effects (including national wildlife refuges, parklands, cultural resources, agricultural resources, and displacements of residences and commercial and industrial facilities); agency, stakeholder, and public positions; and benefits of alternative.

The potential alternatives were evaluated against the HSR system performance criteria: travel time, route length, intermodal connections, capital costs, operating costs, and maintenance costs. Screening also included environmental criteria to measure the potential effects of the proposed alternatives on the natural and human environment. The land use criteria measured the extent to which a station alternative supports transit use; is consistent with existing adopted local, regional, and state plans; and is supported by existing and future growth areas. Constructability measured the feasibility of construction and the extent to which right-of-way is obtainable or constrained. Community impacts measured the extent of disruption to neighborhoods and communities, such as potential to minimize (1) right-of-way acquisitions, (2) dividing an established community, and (3) conflicts with community resources. Environmental resources and quality measured the extent to which an alternative minimizes impacts on natural resources.

2.4.2 Range of Potential Alternatives Considered and Findings

2.4.2.1 Geographic Segments of the [section name] HSR Project Section

Define and describe the area considered in the alternatives analysis and the geographic segments of the HSR section. Project segments are discrete portions of the project corridor (e.g., north to south or east to west) that are distinguished by areas of fundamentally different geographic, community, or project characteristics (e.g., valley vs. mountain, rural vs. suburban vs. urban, main line vs. station approach/departure). Segment transition points do not necessarily correspond to locations where the alignment alternatives converge or diverge from one another within the project section. Segment transition points should be easily identifiable, physical features rather than arbitrary markers (e.g., survey or legal boundaries, engineering stationing). The intent is to divide the project section into geographic segments that:

- Help articulate regional and local conditions and context
- Organize presentation of lengthy end-to-end alternatives (and location-based information in Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Measures)
- Allow the reader to compare impacts of alternatives for a given geographic location of interest using the same geographic segments to consistently organize location-based information
- Help decision-makers work with stakeholders on specific issues related to their jurisdictions

Segments should not bias the assembly of end-to-end alternatives, which are based upon and understandably demonstrate the primary themes or rationales of the HSR segment.

2.4.2.2 Alternatives Considered and Findings

Discuss the range of potential route alternatives and corresponding locations of stations and maintenance facility alternatives that were considered during the alternatives development process.

- Provide a text and map overview of the route, station site(s), and maintenance facility alternatives considered for the HSR section, particularly in relation to the initial corridor and stations selected in the RODs for the Statewide (2005) and Bay Area to Central Valley (2008) Program EIR/EISs. The overview map must clearly show all location details that are used in the text to describe extents or other physical locations of alternatives. Use additional maps where necessary to illustrate detail. Tables may be used to list the alternatives and define abbreviations for use in the overview map.
- Refer to alternatives analysis reports as appropriate to describe the further refinements made to the 2005 and 2008 program alternatives and the reasons for those refinements.
- Include descriptions of horizontal alignments, vertical alignment options, facility sites and configurations.
- Organize the text presentation of end-to-end alternatives by geographic segment, as described in Section 2.4.2.1. The segments are the secondary organizing structure when presenting the set of alternatives considered during Alternatives Analysis and the narrowed set of alternatives that are fully evaluated in the EIR/EIS. Presentation by geographic segment will be the primary organizing structure of affected environment, impacts, and mitigation measures in Chapter 3 of the EIR/EIS.

The *Fresno to Bakersfield Section Final EIR/EIS* provides an example of a brief explanation of the purposes of alternatives analysis:

> *The alternatives analysis provides the reader with an understanding of how alternatives were developed, taking into account alignment and station*

> *development considerations for all of metropolitan Fresno and Bakersfield. The alternatives analysis process evaluated design options within individual alternatives in order to isolate concerns, screen, and refine the overall alternative to avoid key environmental issues or improve performance. The alternatives that were not carried forward had greater direct and indirect environmental impacts, were impracticable, or failed to meet the project purpose. Alternatives included in the Preliminary Alternatives Analysis are discussed in more detail below. Additional information on alternatives preliminarily considered but not carried forward for full evaluation in this EIR/EIS, can be found in the Preliminary Alternatives Analysis Report, Fresno to Bakersfield Section High-Speed Train Project EIR/EIS (Authority and FRA 2010b); the September 2010 Supplemental Alternatives Analysis Report, Fresno to Bakersfield Section High-Speed Train Project EIR/EIS (Authority and FRA 2010c); the Checkpoint B Summary Report (Authority and FRA 2011a); the May 2011 Supplemental Alternatives Analysis Report, Fresno to Bakersfield Section High-Speed Train Project EIR/EIS (Authority and FRA 2011b); and the December 2011 Supplemental Alternatives Analysis Report, Fresno to Bakersfield Section High-Speed Train Project EIR/EIS (Authority and FRA 2011c).*

Describe the primary project objective(s) that define theme(s) or rationale(s) for developing alternatives. The *Fresno to Bakersfield Section Final EIR/EIS* provides several examples of this description in the section-wide and segment-specific contexts.

> *While the alternatives analysis process considered multiple criteria, the project objective to maximize the use of existing transportation corridors and available rights-of-way, to the extent feasible, was emphasized. The alternatives included in the Preliminary Alternatives Analysis follow the existing freight corridors of the Burlington Northern Santa Fe (BNSF) Railway and the Union Pacific Railroad (UPRR).*
>
> *The five initial alternative alignments [in the Fresno subsection] were based largely on the Statewide Program EIR/EIS preferred alignment and included input from the Fresno Technical Working Group and other local stakeholders. These alternatives include the UPRR East, UPRR West, Golden State Boulevard, SR 99, and Fresno West Bypass alternatives.*
>
> *The initial alternatives for the rural subsection originated from a variety of sources. First, the preferred alignment identified in the Statewide Program EIR/EIS was included as part of the analysis. Second, responding to the commitment made in the Statewide Program EIR/EIS to investigate alternatives that serve a potential station in the Visalia-Tulare-Hanford area, the Visalia-Tulare-Hanford Station Feasibility Study (Authority 2007) identified several alternative alignments. Third, initial alternatives were developed in response to input from local, state, and federal agency officials and stakeholders during the scoping process.*
>
> *The initial alternatives reflect combinations of the following four factors:*
>
> - *Primary Route—All of the initial alternatives followed the existing BNSF Railway or UPRR routes, in accordance with the project objective to use existing transportation corridors to the maximum extent possible.*
> - *Traversing Communities—Many of the communities in the south San Joaquin Valley have grown up around the BNSF Railway and UPRR rights-of-way. Initial alternatives were identified that either passed through these communities adjacent to the existing railroad rights-of-way or bypassed the communities.*

- *Visalia-Tulare-Hanford Area Station—A number of initial alternatives were driven by the possible locations for a potential Kings/Tulare Regional Station to serve the Visalia-Tulare-Hanford area.*
- *Transition from UPRR to BNSF Railway Corridor—Because Visalia and Tulare are located along the UPRR corridor, some of the initial alternatives for a Kings/Tulare Regional Station were in the UPRR corridor. However, all of the alternatives needed to return to the BNSF Railway Corridor before entering Bakersfield. The preferred alternative identified in the Statewide Program EIR/EIS calls for a station located in Downtown Bakersfield near the existing Amtrak station on the BNSF Railway line, and both Kern County and the City of Bakersfield passed resolutions supporting this station. By entering Bakersfield from the west along the BNSF Railway Corridor instead of the UPRR Corridor, the HSR would result in far fewer relocation impacts and be more consistent with current and planned land uses.*

The ten preliminary alternatives for the Bakersfield subsection were variations of the Statewide Program EIR/EIS preferred alternative alignment and were developed in coordination with city staff, local stakeholders, and the Bakersfield Technical Assessment Group. Five of the ten preliminary alternatives were grouped under Alternative Family 1. An additional three alternatives were grouped under Alternative Family 2. Alternatives 3 and 4 each include only one alternative. The initial alternatives were based on the factors described below.

- *Truxtun Station—The Statewide Program EIR/EIS process identified a preferred station near Truxtun Avenue in the vicinity of the existing Amtrak station. This location ties into the local transit system and is most compatible with Bakersfield land use plans. A Truxtun station was endorsed by the City of Bakersfield, the County of Kern, and the Kern Council of Governments in 2003.*
- *Operating Speed—The geometry of all the alternative alignments needed to be straight enough to maintain operating speeds of 220 mph through Bakersfield in order to meet travel time goals for the system.*
- *Minimize Impacts on Cultural and Civic Resources—To reach a station site in the vicinity of Truxtun Avenue, the alignment must pass through a densely developed downtown. Initial alternatives were developed to minimize impacts on county and city civic buildings, schools, hospitals, and other important resources.*
- *Refinery—The BNSF Railway passes through the "Flying-J" refinery (purchased by Alon USA Energy, Inc. in 2010) in northwestern Bakersfield. Initial alternatives were developed to avoid this facility.*

Briefly discuss the reasons for rejecting or retaining alternatives for further analysis in the EIR/EIS. Factors for consideration must correspond to the screening characteristics listed in Section 2.4.1 or needed for consistency with adjacent HSR sections. The *Fresno to Bakersfield Section Final EIR/EIS* provides an example of this discussion:

Four of the five alternative alignments were not carried forward for full evaluation in this EIR/EIS. These include the UPRR East, Golden State Boulevard, SR 99, and the Fresno West Bypass alternatives. The UPRR East Alternative was not carried forward for further study as it would result in the demolition or relocation of the Southern Pacific Railroad Depot. The railroad depot is on the National Register of Historic Places and is protected under Section 4(f) of the U.S. Department of Transportation Act.[17] Section 4(f) does not allow the U.S.

[17] *Section 4(f) protects publicly owned land of parks, recreational areas, and wildlife refuges. Section 4(f) also protects historic sites of national, state, or local significance located on public or private land.*

Department of Transportation to use protected properties unless there is no feasible and prudent alternative. The UPRR West Alternative is a feasible and prudent alternative, and therefore the UPRR East Alternative was not carried forward for further consideration.

The Golden State Boulevard Alternative was not carried forward for further study as it would be inconsistent with the City of Fresno's redevelopment vision and would have greater community and environmental impacts with few, if any, environmental benefits relative to the UPRR East and UPRR West alternatives. The SR 99 Alternative was dismissed due to greater impacts on Roeding Park relative to the UPRR West and Golden State Boulevard alternatives, as well as its lack of connectivity to Fresno's central business district.

The Fresno West Bypass Alternative would not be consistent with the project purpose and need or with the objective of using existing transportation corridors to the maximum extent possible. The alternative would also require acquisition of substantially more right-of-way than an alternative that goes through Fresno, and would therefore have substantially more impacts on environmental resources, including agricultural lands. The Fresno West Bypass Alternative was also opposed by both the City and County of Fresno. For these reasons, this alternative was not carried forward for further consideration.

An elevated "cross-over" alternative was carried forward in Fresno. This alternative travels on the eastern side of the UPRR tracks from Clinton Avenue south to Belmont Avenue where it crosses over to the western side of the UPRR tracks at a shallow angle and continues through Fresno on the western side of the UPRR. An at-grade cross-over alternative was determined not to be practicable as it would require two long, skewed crossings beneath the UPRR tracks in a tunnel or covered trench; one 4,000 feet long and the other 3,400 feet long. This would make the total trenching for the at-grade alternative 15,000 feet long as compared to the 7,800 feet required for the elevated cross-over alternative being carried forward. Although included in the alternatives analysis for the Fresno to Bakersfield Section, the cross-over alternative occurs north of the project terminus for this EIR/EIS (Amador Street), and is therefore carried forward in the Merced to Fresno Project EIR/EIS.

While several vertical alignment options were evaluated, building the HSR primarily at-grade was determined to be the only practicable construction method for the Fresno subsection. The Authority and FRA judged that placement of the HSR entirely below-grade would be impracticable. The alignment alternatives pass through a densely developed area of Fresno with many underground utilities, all of which would have to be relocated if the HSR were placed in a trench or a cut-and-cover tunnel. Construction of a trench or cut-and-cover tunnel would also result in a lengthy disruption of traffic patterns because each road crossed by the HSR would need to be closed and then rebuilt after the HSR infrastructure was completed. Construction of an entirely below-grade HSR would be much more expensive than the other vertical alignment options. For these reasons, an entirely below-grade alignment in Fresno was not carried forward for further consideration.

Although a stacked set of HSR tracks would reduce the amount of property that would need to be acquired over the 6,000-foot length of the station tracks, this configuration would involve costly and complex design and construction and would not reduce the other impacts associated with at-grade or elevated sets of tracks. Therefore, a stacked configuration was also not carried forward for further consideration.

An elevated structure was initially planned for this subsection; however, the high cost associated with the elevated structure in addition to City of Fresno concerns regarding its impacts through downtown Fresno led to the development of an at-grade alignment. The Authority conducted a value engineering study in January 2011 that found that at-grade construction would provide large project cost reductions. Design solutions were developed to remedy the infrastructure conflicts and design constraints described in previous alternatives analyses and it was determined that the HSR would be built at-grade through Fresno.

Initial investigations and discussions with representatives of the City of Fresno indicated a preference for a station oriented toward the downtown. The city staff's preference is for a station located at Mariposa Street on the east side of the UPRR right-of-way, oriented toward Fresno's "front door."

All the alternative alignments considered for the Fresno subsection feature a downtown station in the area generally bounded by Stanislaus Street on the north, Ventura Street on the south, H Street on the east, and SR 99 on the west. Because all of the alternative alignments provided the opportunity for a long stretch of straight track through this area, they afforded considerable flexibility for the location of the station platforms. Alternative stations were evaluated on the UPRR East and UPRR West alternative alignments between Stanislaus, H, Inyo, and G Streets. Alternative stations on the Golden State Boulevard Alternative Alignment were evaluated between Stanislaus, G, Tulare, and F Streets. For the SR 99 Alternative Alignment, stations were evaluated between Stanislaus, E, and Tulare Streets, and SR 99.

Two Downtown Fresno station alternatives were carried forward in the Draft EIR/EIS, one at Mariposa Street and the other at Kern Street. On May 3, 2012, the Authority Board certified the Merced to Fresno Section Final EIR/EIS and selected the Mariposa Alternative as the Fresno station location. FRA issued a ROD that included this station site in September 2012. The environmental evaluation of the Fresno station alternatives carried forward in the Draft EIR/EIS demonstrated that environmental impacts were similar. Both the Mariposa and Kern station alternatives would affect a historic structure eligible or already on the National Register of Historic Places. Other effects include noise that would be mitigated, as well as temporary impacts on businesses and transportation circulation during construction. However, due to the City of Fresno's planning and the orientation of the Downtown Fresno City Center, the Mariposa Station alternative offers substantially more opportunities for transit-oriented development.

2.5 Alignment, Station Site(s), and Heavy Maintenance Facility or Terminal Storage and Maintenance Facility Site(s) [as applicable] Alternatives Evaluated in this Project EIR/EIS

Describe the project alternatives carried forward for further analysis in the EIR/EIS, beginning with the No Project Alternative and then the HSR alternatives. Organize the presentation of end-to-end alternatives by the same geographic segments defined in Section 2.4.

Introduce the presentation by identifying the HSR section study area and project termini. Provide a list and summary of the geographic extent(s) of the HSR section alternative alignments, stations, and maintenance facilities. Also refer to detailed information in Volume 2 of the EIR/EIS in the introductory text:

- Appendix 2-A for the detailed list of associated roadway modifications required to accommodate the HSR system—Show all modifications (closures, overcrossings, or undercrossings) in maps illustrating each HSR build alternative.
- Appendix 2-B for the detailed lists of associated railroad crossings.
- Appendix 3.1-A for the map book of the project footprint for all alternatives, including all project components and consequential physical changes, including stations, potential maintenance sites, wayside and other ancillary HSR facilities, areas needed for construction mobilization and material laydown, roadway and utility relocations, power supply connections, and associated property rights.

2.5.1 No Project Alternative—Planned Improvements

The No Project Alternative considers the effects of land use planned for the region encompassing the HSR project section and planned improvements to the highway, aviation, conventional passenger rail, freight rail, and port systems in the HSR project area through the 2040 time horizon for the environmental analysis.

2.5.1.1 Planned Land Use

Objectively describe the study area’s land use patterns as they would exist without the project. Discuss projected growth rates in study area, including a tabular summary of projected population and employment growth from the HSR project base year through 2040 according to the California Department of Finance for counties (including their cities) in the study area. Describe the land area that will be needed for residential, commercial, and industrial development and supporting transportation, water treatment, parks, medical, and other infrastructure to accommodate projected population growth.

Discuss the adopted general plans (and related specific plans and community plans) of the counties and cities in the study area and implications on future land use patterns.

Section 2.4.1.1 of the *Fresno to Bakersfield Section Final EIR/EIS* provides an example of this discussion and summary tables.

2.5.1.2 Planned Highway Improvements

Summarize the change in demand for travel between regional destinations that will result from planned development patterns, population, and employment growth. Discuss projected vehicle miles traveled (VMT) in the study area. Include table showing the projected VMT for the year 2040 in the study area and region. The *Fresno to Bakersfield Section Final EIR/EIS* provides an example of this summary:

> *The regional measure for growth in travel patterns is the amount of VMT in one year. Between 2009 and 2035, VMT is projected to increase 67 percent in the four-county region. According to a statewide transportation projection conducted by Cambridge Systematics, VMT per year in the region is projected to increase from approximately 48 million to almost 80 million in 2035 (Cambridge Systematics, Inc. 2012).*

The highway element of the No Project Alternative includes the planned efforts of Caltrans and the four study area counties to address anticipated growth in VMT and resulting congestion on the roadway system. Table 2-3 shows the projected VMT for the four counties and region in 2009 and 2035.

Table 2-3 Increase in Total Daily Vehicle Miles Traveled (excerpt) (example only)

County	2009 Daily VMT (estimate)	2035 Daily VMT (estimate)	Estimated Increase in VMT (% of 2009 VMT)
Fresno	17,311,000	27,368,000	58

Describe the transportation projects planned by Caltrans and the metropolitan planning organizations and regional transportation plan agencies in the study area in the regional transportation plans (RTP) for each of the counties in the study area to address anticipated growth in VMT and resulting congestion on the roadway system.

List the funded and programmed improvements on the intercity highway network based on financially constrained RTPs developed by the regional transportation planning agencies in a separate table for each county. Provide a map of the intercity transportation network within the HSR project study area and provide a map showing the locations of planned highway improvements listed in the county tables. The *Fresno to Bakersfield Section Final EIR/EIS* provides examples of the summary table (*Table 2-4*) and map (*Figure 2-22*).

Table 2-4 No Project Alternative—Planned Improvements in Fresno County (excerpt) (example only)

Location/ Map No.	Routes	Planned Improvements	Project Timeline
21	BNSF Railway	Conejo Double Tracking (Drill Track)	2015-2035

Source: BNSF Railway 2010.
See Figure 2-22 to cross reference the planned improvement.

2.5.1.3 Planned Aviation Improvements

Identify airports providing commercial service to HSR project study area. Briefly describe each airport, discuss factors affecting future growth in regional travel, and describe improvements planned to accommodate the anticipated growth.

Section 2.4.1.3 of the *Fresno to Bakersfield Section Final EIR/EIS* provides an example of this discussion and summary table of passenger usage.

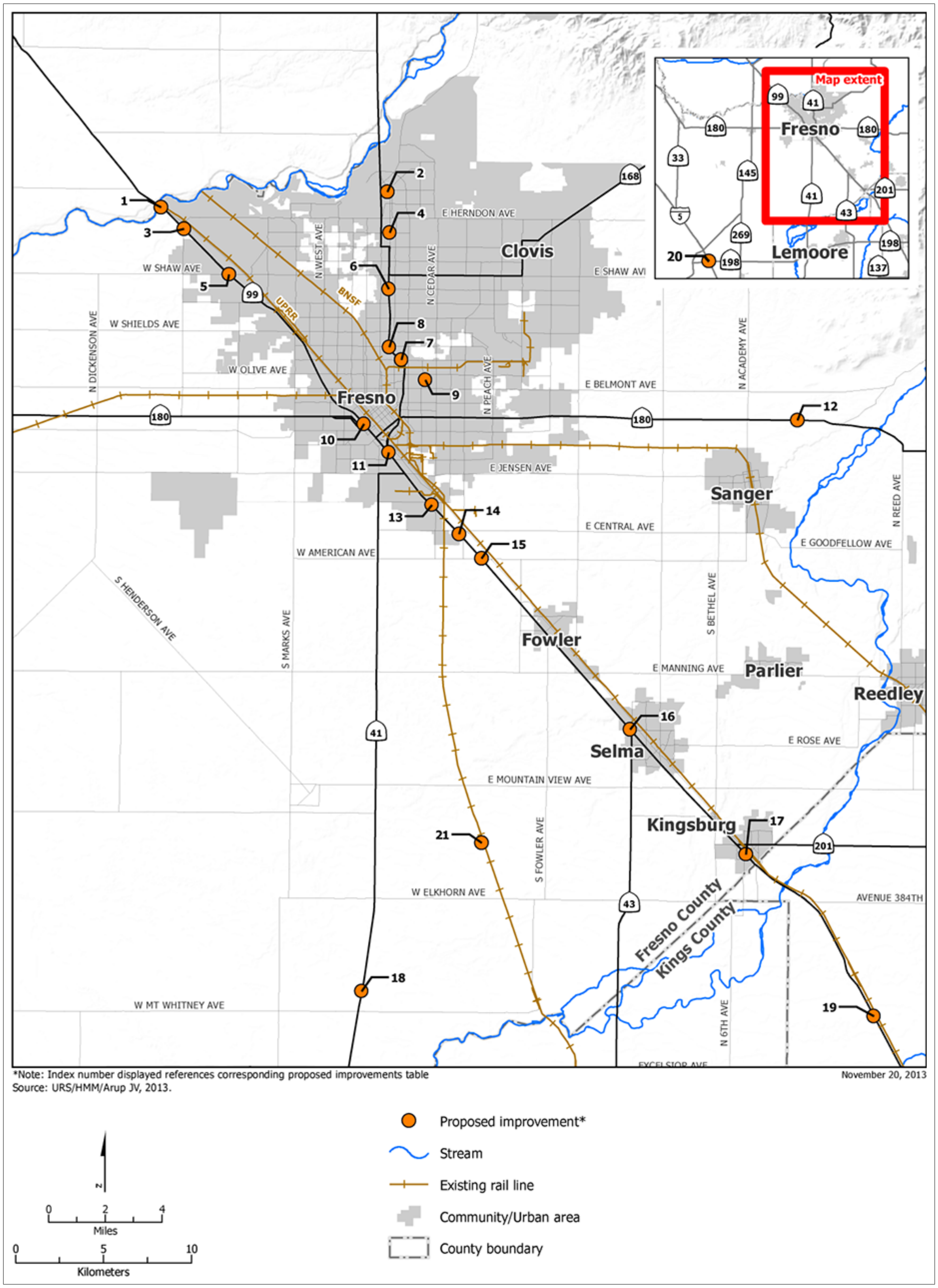

Figure 2-22 No Project Alternative planned improvements in Fresno County (example only)

2.5.1.4 Planned Intercity Rail and Bus Improvements

Conventional Passenger Rail

Describe planned improvements to intercity passenger rail and bus service in the HSR project study area, including projected ridership growth, included in the Caltrans' California State Rail Plan and any other relevant improvement plans. Include table identifying improvements programmed in the latest California State Rail Plan and other passenger rail business or capital improvement plans applicable within the HSR section. The *Fresno to Bakersfield Section Final EIR/EIS* provides an example of this discussion and table:

> *Intercity passenger rail system improvements identified in the Caltrans' California State Rail Plan for implementation before 2020 are included in the No Project Alternative.* Table 2-5 *identifies these improvements, which consist of additional track capacity, construction of double track, and design and construction of a layover facility in Fresno.*

Table 2-5 Programmed Improvements in 2008 California State Rail Plan (excerpt) (example only)

Project Title	Project Description	Project Timeline
Hanford to Shirley	Increases capacity and OTP	By 2017/18

Source: Caltrans 2008a
OTP = on-time performance

> *In addition to these programmed improvements, the State Rail Plan also identified additional capital improvements that are needed to support the planned service improvements. These currently unfunded capital improvements that include track and signal projects to increase capacity between Fresno and Bakersfield were not included in this evaluation because of the funding uncertainty. The plan also identifies the intent to develop options for originating some trains in Fresno and extending rail service from Bakersfield to Los Angeles.*
>
> *In 2008, Caltrans, in partnership with the counties along the San Joaquin route, completed the San Joaquin Corridor Strategic Plan, assuming no HSR system. This study formalized the short-, medium- and long-term visions for the corridor and developed a preferred alternative and recommended improvement projects. The preferred plan provides a phased approach for service and capacity improvements. Many of the short- and mid-term improvements are included in the State Rail Plan. Longer-term improvements (25 years) include completing the double tracking of the corridor. The San Joaquin Corridor Strategic Plan and current State Rail Plan do not incorporate HSR service, but it is anticipated that revised plans will be developed that address the changing role for the San Joaquin route as a feeder service to the HSR system.*

Intercity Passenger Bus Service

Describe projected future intercity passenger bus service in the HSR project study area, such as Greyhound and other public or common carriers, including bus terminal locations and schedule of service, to the extent that is reasonable given current information. The *Fresno to Bakersfield Section Final EIR/EIS* provides an example of the intercity passenger bus service discussion:

> *Regional bus service in the study area is provided by Greyhound, which provides scheduled bus service though the San Joaquin Valley, with bus terminals located in the cities of Fresno, Hanford, and Bakersfield. Greyhound provides daily service from the Fresno, Hanford, and Bakersfield stations to destinations such*

as San Jose, San Francisco, Sacramento, Los Angeles, San Diego, and Las Vegas. Greyhound operates 5 daily trips to San Francisco, 4 daily trips to Sacramento, and 10 daily trips to Los Angeles. Service to Las Vegas is provided via transfers at Bakersfield or Los Angeles.

In the Fresno area, additional regional bus service is provided by Transportes InterCalifornias. This service provides daily round trip service between Fresno and Los Angeles with connecting service to Santa Ana, San Ysidro, Tijuana, and Mexicali, as well as daily round trips to Stockton and San Jose. Service also is provided to numerous intermediate points within the area. Bus services within the City of Fresno are provided by the Fresno Area Express.

The Kings Area Rural Transit Agency provides transit services within the City of Hanford and has intercity connector routes with Lemoore, Avenal, Corcoran, Visalia, Fresno and Laton. The Tulare County Area Transit has routes that connect all the major cities within Tulare County.

In Kern County, Kern Regional Transit (KRT) provides service throughout the county, with connections between Wasco, Shafter, and Bakersfield. KRT provides several other connections as well, including service from Inyokern to the Eastern Sierra Transit Agency, which serves Inyo and Mono counties. The Golden Empire Transit (GET) District provides services throughout the City of Bakersfield and the connecting communities. The Long-Range Transit Plan for GET is currently underway. The plan is anticipated to include intercity bus service expansion and be adopted in early 2012 (Kern COG 2011). Continued service is an element of the No Project Alternative, but serves only a small portion of the intercity travel market.

2.5.1.5 Freight Rail Improvements

Identify and describe any freight railroads operating through/along the HSR project section, including location, operators, and right-of-way. Describe any capacity expansion plans, including number of daily train trips, typical operating schedule, and operating capacity. Correlate with planned improvement projects identified in Section 2.5.1.2. The *Fresno to Bakersfield Section Final EIR/EIS* provides an example of the freight rail discussion:

Operating along the corridor's length, two Class I freight railroads (BNSF and UPRR) serve the Fresno to Bakersfield Corridor. The San Joaquin Valley lines for both the BNSF Railway and UPRR are important segments of their national rail systems. Freight rail traffic nationally has been growing, with a 31.4 percent increase in ton-miles of freight activity between 1997 and 2007 (Bureau of Transportation Statistics 2010).

Freight rail movements in the San Joaquin Valley are primarily interstate rail movements because the railroads generally focus on shipments of 700 miles or more. However, while trucking is the dominant mode for moving freight (with rail serving only 11 percent of the total tonnage), local markets are also served by the San Joaquin Valley Railroad (SJVR), a short-line railroad that interchanges with the BNSF at Fresno and Bakersfield, and with the UPRR at Fresno, Goshen Junction, and Bakersfield. The growth in roadway congestion is expected to increase reliance on rail traffic, as noted in the Fresno County RTP.

The BNSF Railway alignment is generally located west of the SR 99 corridor. BNSF is also the primary owner of the railroad right-of-way used by the Amtrak San Joaquin route. The average number of daily one-way train operations within the corridor is 20 to 24 daily train trips, of which 12 are Amtrak trains. The railroad owns a 276-mile section of the San Joaquin corridor from Bakersfield to

Port Chicago, 6.5 miles east-northeast of Martinez in Contra Costa County. An increase in operations may constrain plans to increase Amtrak service, unless more of the corridor becomes double-tracked.

UPRR parallels SR 99 for most of the corridor. UPRR along this corridor is primarily single track and has an average number of 20 to 24 daily one-way train trips within the corridor (FRA Office of Safety 2010).

Both the BNSF Railway and UPRR are currently operating near capacity and (according to the 2008 Goods Movement Study) will be above capacity by 2035. No formal capacity expansion plans are available for the freight corridors between Fresno and Bakersfield. However, future BNSF candidate double-tracking projects are included in this analysis as planned improvement projects. The BNSF Railway will also gain capacity from planned improvements for the expansion of Amtrak San Joaquin service, as defined in the State Rail Plan. Historically, both railroads have added capacity when needed to meet market demand. Future improvements are expected to continue to provide sufficient capacity for interstate needs.

2.5.1.6 Planned Port Improvements

Future development of ports and associated goods transport systems are important aspects of the regional circulation system of some HSR project sections. Identify the port(s) that influence travel demand and congestion in the HSR project study area. Briefly describe each port and the travel modes and networks affected by the port(s), discuss factors affecting growth in future port-related regional travel, and describe improvements planned to accommodate the anticipated growth.

2.5.2 HSR Build Alternatives—Overview

2.5.2.1 Summary of Design Features

Alignments

Summarize the end-to-end HSR project alignment alternatives, stations, and maintenance sites carried forward for further study in the EIR/EIS by map of location/extent and summary table of design features. Clearly delineate each alternative alignment, station and maintenance site in the section-wide map. Figure 2-23 from the *Fresno to Bakersfield Section Final EIR/EIS* is an example of this illustration. Include the following features of preliminary-level design[18] for each end-to-end alternative in the summary table:

- Total length (linear miles)
- At-grade profile (linear miles)
- Elevated profile (linear miles)
- Below-grade profile (linear miles)
- Number of straddle bents
- Number of railroad crossings
- Number of major water crossings
- Number of road crossings
- Approximate number of public and private roadway closures
- Number of roadway overcrossings and undercrossings

[18] See Authority Technical Memorandum *15% Design Scope Guidelines, TM 0.1* (April 2013) and *Typical Cross Sections, TM 1.1.21, Rev 1*.

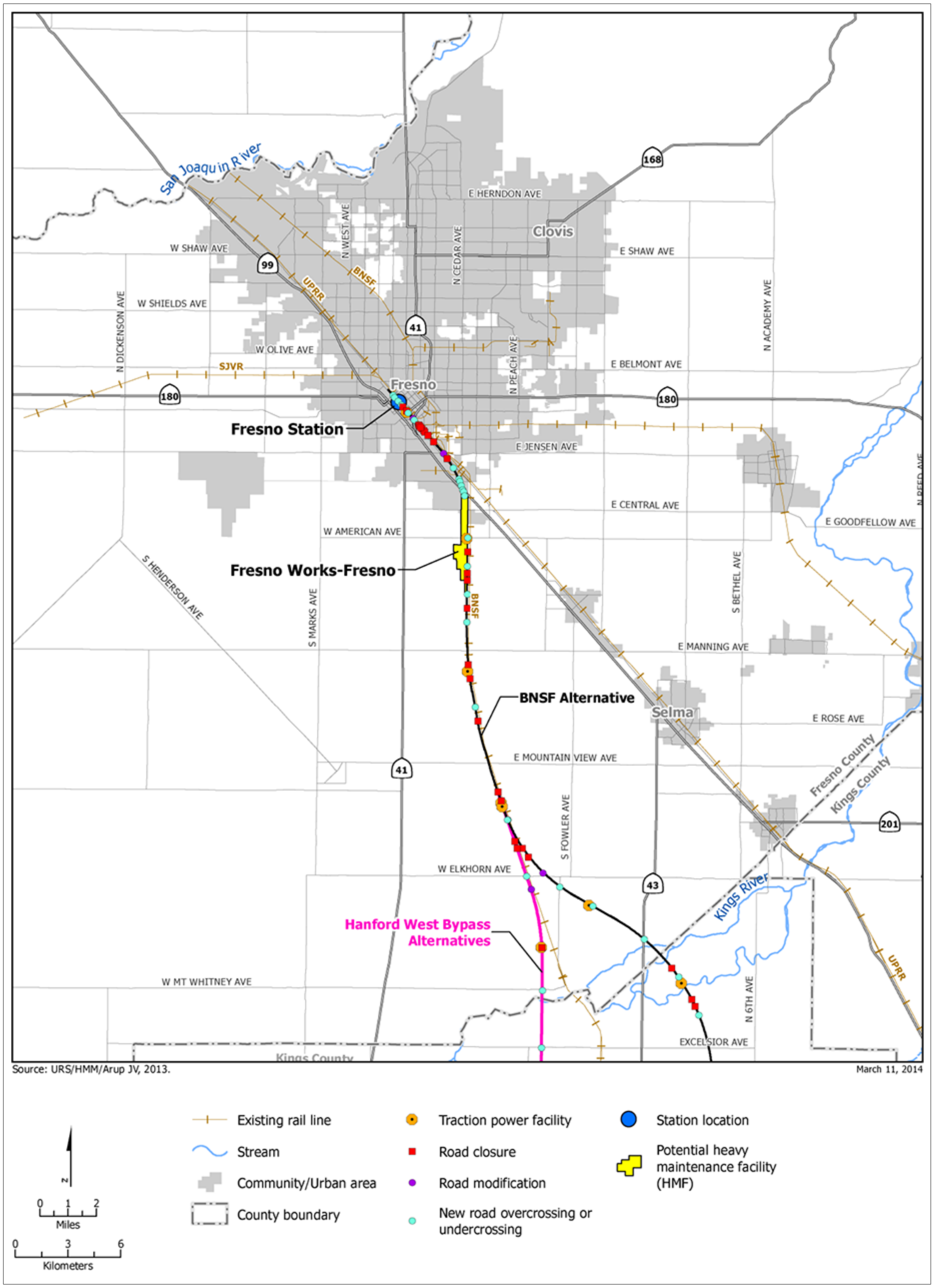

Figure 2-23 Fresno County HSR Alternatives (example only)

State that alternatives presented in EIR/EIS reflect refinements made to the project design to avoid and minimize impacts on known environmental and community resources. Where appropriate to the HSR section and directed by the Authority and FRA, disclose the preliminary proposed or preferred alternative. If a preliminary proposed or preferred alternative is disclosed, discuss the process and determinations that led to the designation. Note the primary performance measures, distinguishing characteristics, unifying frameworks, or policy themes of importance in the HSR project section (e.g., travel time, minimizing impacts to prime agricultural lands, providing maximum opportunities for TOD, locating within existing transportation corridors, avoiding community disruption). The *Fresno to Bakersfield Section Final EIR/EIS* provides an example of this discussion:

> *A key performance measure of each of the alternatives is the travel time between key destinations. The state-legislated HSR system requirement is to provide for a nonstop service travel time between San Francisco and Los Angeles of 2 hours and 40 minutes, as well as a 2-hour-and-20-minute trip between Los Angeles Union Station and Sacramento. Because the Fresno to Bakersfield HSR alignment alternatives are located along the same corridor, travel times by alternative are similar. Selection of the Bakersfield Hybrid Alternative would increase travel time by approximately 1 minute.*

Station Site(s)

List the station locations proposed for the HSR section, the site alternatives for each station, and the functional elements of the stations (e.g., size of station area, station access features, platforms, station building). Chapter 6B of the *Statewide HST Program Final EIR/EIS*, Chapter 6 of the *Bay Area to Central Valley HST Program Final EIR/EIS*, and the Authority's adopted *High-Speed Train Station Area Development Policies* provide direction for the selection of HSR station locations in subsequent project-level CEQA and NEPA processes. Refer to station location criteria in Sections 6B.2 and 6.2 "Implementation of HSR Station Area Development Guidelines" of these two Final EIR/EIS chapters when evaluating station alternatives.

Provide a table summarizing the planning and design assumptions for the stations throughout the phased implementation of the HSR system. Use ridership forecasts for the "high" ridership scenario (at the 75th percentile of probability for equal or lower ridership), based upon the most recent modeling by Cambridge Systematics and according to the most recent version of the Authority Technical Memorandum *Station Boarding, Access, Egress, and Parking Guidance* (draft in progress). Include the following data in the summary table:

- Average daily boardings at each station in 2022, 2026, 2027, 2028, 2029, and 2040 (or Phase 1 milestone years from the most recently adopted California High-Speed Rail Authority (Authority) Business Plan)
- Constrained parking demand at each station in 2022, 2026, 2027, 2028, 2029, and 2040 (or Phase 1 milestone years from the most recently adopted Authority Business Plan)
- Type of station
- Platform length (station box)
- Combined width of platform and trackway (width of station box and right-of-way)
- Storage track locations and configurations
- Blended system/operations features, where applicable

Proposed Heavy Maintenance Facility Sites [as applicable]

List the sites considered for an HMF within the HSR section and summarize the physical requirements of an HMF site, including connections to highways and utilities, track configurations and train movements, maintenance buildings, etc. Summarize the following information in a summary table:

- HMF name(s)
- HMF site location(s)
- Available acreage(s)
- Property characteristics (e.g., economic incentives to select the site, proximity to HSR alignment, capacity to accommodate range of HSR operations and maintenance facilities, highway or roadway access, proximity to utilities, potential for HSR-supportive synergies or collaboration with other entities, presence and extent of sensitive natural or community resources or development constraints, relative impact on natural or community resources)
- Build alternatives that could be served by the HMF site(s)

The *Fresno to Bakersfield Section Final EIR/EIS* provides an example of the general HMF content:

> *The Authority is studying five HMF sites for the Fresno to Bakersfield Section. The sites vary in size, physical factors, and accessibility to the alternatives under study. Those analyzed in this Final EIR/EIS include the following:*
>
> - Fresno Works–Fresno
> - Kings County–Hanford
> - Kern Council of Governments–Wasco
> - Kern Council of Governments–Shafter East
> - Kern Council of Governments–Shafter West
>
> *The HMF would occupy a site of approximately 154 acres within proximity of the HSR alignment. The HMF would also have connections to highways and utilities on a parcel zoned for heavy industrial activities. No new roadway crossings or shifts are expected to occur from the access tracks that have not already been crossed or closed by the proposed BNSF Alternative.*
>
> *Tracks would be built through the facility building(s), and trains would normally enter and leave under their own electric power. It is assumed that several movements into and out of the main shop building would occur on every shift, and that there would be movements between the train yard and the shop on every shift. The shop would have a high roof (to accommodate transverse cranes that can lift whole train cars). Maintenance buildings would likely be prefabricated steel buildings.*
>
> Table 2-6 *describes each proposed HMF, its location, and property characteristics.*

Table 2-6 Fresno to Bakersfield Section HMF Site Descriptions (excerpt) (example only)

Name	Location/Description	Property Characteristics
Fresno Works–Fresno	▪ 590 available acres ▪ Located within the southern limits of the city of Fresno and county of Fresno next to the BNSF Railway right-of-way between SR 99 and Adams Avenue ▪ Site would serve all of the alternatives under consideration	▪ Economic incentives include $25 million to be used by the Authority for site acquisition, infrastructure, utilities, and construction ▪ Immediately accessible from HSR tracks ▪ Existing roadway access ▪ 3 acres located in floodplain ▪ Close proximity to utilities ▪ 9 waterways onsite

Terminal Storage and Maintenance Facilities [as relevant to HSR Section]

List the sites considered for a TSMF within the HSR Section and summarize the physical requirements of a TSMF site, including connections to highways and utilities, track configurations and train movements, maintenance buildings, etc. Summarize the following information in a summary table:

- TSMF name(s)
- TSMF site location(s)
- Available acreage(s)
- Property characteristics (e.g., economic incentives to select the site, proximity to HSR alignment, capacity to accommodate range of HSR operations and maintenance facilities, highway or roadway access, proximity to utilities, potential for HSR-supportive synergies or collaboration with other entities, presence and extent of sensitive natural or community resources or development constraints, relative impact on natural or community resources)
- Build alternatives that could be served by the TSMF site(s)

Safety and Security

Safety and security are priority considerations in the planning and execution of all work activities for the California High-Speed Rail Program. The system safety and system security program for the development and operation of high-speed rail is described in the Authority's Safety and Security Management Plan (SSMP). Based upon Federal Transit Administration guidelines for the safe and secure development of major capital projects, the SSMP includes the Authority's Safety and Security Policy Statement, roles and responsibilities for safety and security across the project, the program for managing safety hazards and security threats/vulnerabilities, safety and security certification program requirements, and construction safety and security requirements.

A hierarchy of controls shall be applied when considering the management of identified hazards:

1. Avoidance
2. Elimination
3. Substitution
4. Engineering Controls
5. Warnings
6. Administrative Controls
7. Personal Protection Equipment

The safety and security of HSR passengers, employees, and the surrounding communities are assured through the application of risk-based System Safety and System Security programs that identify, assess, avoid, and mitigate hazards and vulnerabilities for the HSR. Using domestic and international regulations, guidance, and industry best practices, the objective of the HSR System Safety and System Security programs is to ensure that risk-based hazard mitigation measures are adequately and consistently applied.

The HSR alignment will be fully access-controlled, meaning that the public will be able to access the system only at the station platforms. Access-control barriers and railway/roadway vehicle barriers along the right-of-way will prevent intrusion into the right-of-way.

HSR trainsets and fixed infrastructure will employ the latest safety features and designs to enable the trains to stay upright and in-line in the event of a derailment. ATC systems will provide additional protections against collisions, derailments, outside hazards such as intrusions into the right-of-way, earthquakes, and severe weather conditions.

The HSR guideway, stations, and associated facilities will include fire and life-safety infrastructure (including fire and smoke prevention and control); security and communications systems; features to manage adjacent hazards from electrical and other utilities, hazardous materials facilities, oil and gas wells, and wind turbines.

Appropriate setbacks and access controls for adjacent facilities or underneath elevated structures, based upon existing regulations, guidance, or site-specific analysis, will ensure the safety and security of both the HSR operation and adjacent communities.

Summarize the safety and security plans and features of the HSR section, based upon information developed by the section and PMT design/engineering and safety and security teams as part of preliminary design of the project, including:

- System Safety Program Plan, including a Safety and Security Certification Program
- Threat and Vulnerability Assessment
- Preliminary Hazard Analysis
- Rail Vehicle Preliminary Hazard Analysis
- Fire Life Safety Program
- System Security Plan

See the PMT Technical Memorandum *2.8.1 Safety and Security Design Requirements for Infrastructure Elements* [19] for a description of the safety and security requirements for infrastructure elements for the high-speed rail program.

Modification of State Highway or Route Facilities

Summarize the general types of modifications to Caltrans facilities that would result from proximity to the HSR build alternatives. The following text from the *Fresno to Bakersfield Section Final EIR/EIS* can be adapted to describe these modifications.

State Highway Underpasses

Where the HSR alignment is proposed to cross over state highway facilities in various locations as an aerial structure, the possibility of encroachment into the Caltrans right-of-way would depend on the placement of the HSR aerial structure columns. Temporary closure of the Caltrans right-of-way may be required for placement of precast aerial structure sections. Traffic would be detoured onto local streets during such closures.

[19] See Authority website, www.hsr.ca.gov/docs/programs/eir_memos/TM%202.8.1%20Safety%20and%20Security%20Design%20Requirements%20R0%20120312no%20sigs.pdf

Roadway Overcrossings

Where the HSR alignment is at-grade and runs parallel to state facilities, access would be severed where an at-grade leg of an intersection crosses the HSR alignment. Therefore, road overcrossings would be required to maintain function of the state highway and local road systems. Intersecting roads would be realigned horizontally and adjusted vertically to cross over the state highway. The possibility of encroachment into the Caltrans right-of-way would depend on the placement of the overcrossing columns. The design intent of these crossings is to maintain the existing intersection and traffic patterns during construction. However, when conforming to the existing roads, some short-term closures may be required, and local traffic would utilize one of the other overcrossings or intersections in the vicinity.

Eliminating Leg of Intersections

The elimination of one leg of an existing at-grade intersection with a state highway was deemed necessary where the road was in close proximity to other accessible, proposed overcrossings, or its existing average annual daily traffic was not high enough to warrant its own overcrossing. In these circumstances, the access would be severed along the leg of the intersection that the HSR track traverses. There are no impacts on the Caltrans right-of-way as no structures are required. Local traffic would utilize one of the other overcrossings in the vicinity.

Ramp Modifications

Ramp modifications would be required where the HSR track is on an aerial structure and the proposed columns directly impact the existing alignments of roadways or off-ramps. These ramps would be modified to avoid the proposed columns and to accommodate any other roadway realignments that result from the aerial structure columns. Although the modifications would be slight, additional right-of-way may be required for the realigned off-ramps. Roadway traffic would likely use existing facilities while the realigned ramps are being constructed.

List the Caltrans facilities that would be crossed by the HSR build alternatives in a table that includes a summary of the highway(s) or route(s), the type of change that would be caused by the HSR guideway, and the HSR build alternative(s) that would cause the change. Provide a section-wide map that shows the locations of the affected state facilities and indicates the associated HSR build alternative(s).

The *Fresno to Bakersfield Section Final EIR/EIS* provides an example of the tabular inventory and location map of modified Caltrans facilities (*Table 2-7* and *Figure 2-24*):

Table 2-7 Impact of HSR Alternatives on Caltrans State Facilities (excerpt) (example only)

No.	Dist-County-Hwy-PM	Location	Requirements		HSR Alternative
			Modify	Easement	
1	06-Fre-41 (PM 21.9)	SR 41		X	BNSF
2	06-Fre-99 (PM 17.03)	SR 99 NB Off-ramp		X	BNSF
3	06-Fre-99 (PM 17.03)	SR 99		X	BNSF
4	06-Fre-99 (PM 17.03)	SR 99 SB On-ramp		X	BNSF
5	06-Fre-43 (PM 1.06)	SR 43	X	X	BNSF
6	06-Kin-198 (PM 21.5)	SR 198		X	BNSF
7	06-Kin-198 (PM 26.4)	SR 198	X	X	Hanford West Bypass 1 and 2

Where Modify and Easement boxes are both checked, the project requires an easement over/under the State Highway and changes to the existing roadway.
NB = northbound; PM = post mile; SR = state route

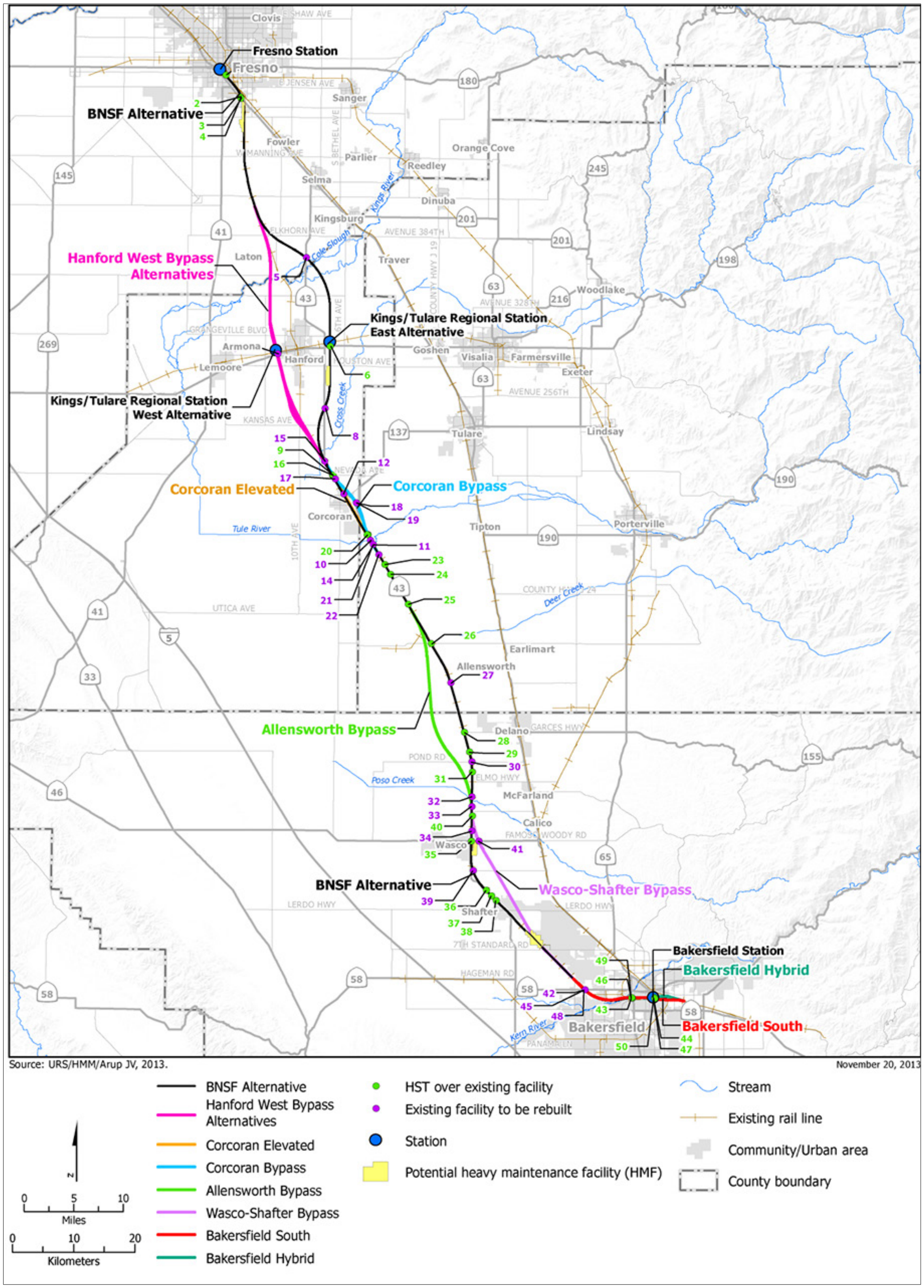

Figure 2-24 Location of state highways or routes affected by HSR alternatives (example only)

Modification of Freight or Passenger Railroad Routes or Facilities

Analogous to the information presented on Caltrans facilities, provide a brief discussion of the general types of modifications to railroad facilities that would result from proximity to the HSR build alternatives, including (but not limited to):

- Grade modifications or separations
- Branch or other track re-routes or closures
- Acquisition of rights-of-way
- Operating schedule changes
- Temporary actions to accommodate passenger and freight railroad operations during HSR construction periods

List the freight and passenger railroad facilities that would be crossed by the HSR build alternatives in a table that includes a summary of the railroad track(s), yard(s), station(s), grade crossing(s); the type and duration of change that would be caused by the HSR guideway; and the HSR build alternative(s) that would cause the change. Provide a section-wide map that shows the locations of the affected railroad routes and facilities, and indicates the associated HSR build alternative(s).

2.5.2.2 HSR Project Impact Avoidance and Minimization Features

As part of good environmental planning, pursuit of Authority objectives for environmental stewardship and sustainability, and compliance with Authority environmental commitments, project design and construction features will be incorporated in the HSR build alternatives to avoid or minimize environmental and community impacts. Disclose integration of these features in the project description, demonstrate efficacy and implementation by the project, and provide appropriate accounting of environmental benefits in analysis of potential environmental impacts of the project. For each feature that will be deployed in the HSR section, demonstrate the means and effectiveness in avoiding or minimizing impact(s) with respect to relevant threshold(s) of significance. Where features cannot be described in sufficient, definitive detail to substantively demonstrate effectiveness, provide reasonable assumptions and performance standards for implementation to achieve intended outcomes.

Determine, through consultation with PMT and RC design disciplines, the feasibility and describe the practical means of implementing impact avoidance and minimization features as part of the HSR project, including:

- Parameters, process, and responsibility for transforming features into tangible design elements and specifications
- Specific direction for integration in the design-build contractor procurement and design-build contractor proposals
- Mandatory direction for design-build contractor products or activities (e.g., Environmental Compliance Manual, final construction documents)
- Process and roles for measuring and reporting implementation, effectiveness, and adaptive management (if needed)

List the common project design and construction features that are incorporated in the HSR build alternatives to avoid or minimize environmental and community impacts. For impact avoidance or minimization features that are not part of all alternatives, clearly indicate alternatives for application. Organize the list of impact avoidance and minimization features and discussions of efficacy and implementation by resource area or topic. Detail the substantive, factual basis for determining efficacy, feasibility, and implementation in Volume 2, Appendix 2-E, Project Impact Avoidance and Minimization Features Analysis. Provide specific reference to the appendix to assist the reader in navigating between Volume 1 and Volume 2. Before presenting the HSR build

alternatives in the EIR/EIS, briefly describe the features and their efficacy, feasibility, and implementation. Conclude with a table, organized primarily by alternative and secondarily by resource area or topic, which associates each deployed feature with the particular environmental or community impact(s) that will be avoided or minimized by the feature.

Account for the environmental protection afforded by integrated impact avoidance and minimization features in relevant significance determinations in Chapter 3 of the EIR/EIS. Include impact avoidance and minimization features that are integrated in the Preferred Alternative in the Mitigation Monitoring and Enforcement Plan for the HSR section.

The following features are examples that can be adapted for application to the HSR section. The following text may be used to introduce the description of impact avoidance and minimization features that are selected and refined for incorporation into the HSR project alternatives:

The Authority and FRA have committed to integrate programmatic impact avoidance and minimization measures consistent with the (1) 2005 Statewide Program EIR/EIS, (2) 2008 Bay Area to Central Valley Program EIR/EIS, and (3) 2012 Partially Revised Final Program EIR into the HSR project. The Authority and FRA will implement these measures during project design and construction, as relevant to the HSR project section, to avoid or reduce impacts. These measures are considered to be part of all [or particular, as indicated] build alternatives and will include:

Transportation

1. Off-Street Parking for Construction-Related Vehicles—Identify adequate off-street parking for all construction-related vehicles throughout the construction period. If adequate parking cannot be provided on the construction sites, designate a remote parking area and use a shuttle bus to transfer construction workers to the job site.

2. Maintenance of Pedestrian Access—Prepare specific construction management plans to address maintenance of pedestrian access during the construction period. Actions to limit pedestrian access would include, but not be limited to, sidewalk closures, bridge closures, crosswalk closures or pedestrian rerouting at intersections, placement of construction-related material within pedestrian pathways or sidewalks, and other actions that may affect the mobility or safety of pedestrians during the construction period. If sidewalks are maintained along the construction site frontage, provide covered walkways. Maintain pedestrian access where feasible (i.e., meeting design, safety, ADA requirements).

3. Maintenance of Bicycle Access—Prepare specific construction management plans to address maintenance of bicycle access during the construction period. Actions to limit bicycle access would include, but not be limited to, bike lane closures or narrowing, closure or narrowing of streets that are designated bike routes, bridge closures, placement of construction-related materials within designated bike lanes or along bike routes, and other actions that may affect the mobility or safety of bicyclists during the construction period. Maintain bicycle access where feasible (i.e., meeting design, safety, ADA requirements).

4. Restriction on Construction Hours—Limit construction material deliveries between 7 a.m. and 9 a.m. and between 4 p.m. and 6 p.m. on weekdays. Limit the number of construction employees arriving or departing the site between the hours of 7 a.m. and 8:30 a.m. and 4:30 p.m. and 6 p.m. Limits will be determined as part of the Construction Transportation Plan.

5. Construction Truck Routes—Deliver all construction-related equipment and materials on the appropriate truck routes. Prohibit heavy-construction vehicles from accessing the site via other routes. Truck routes will be established away from schools, day care centers, and residences, or at a location with the least impact if the Authority determines those areas are unavoidable.

6. Protection of Public Roadways during Construction—Repair any structural damage to public roadways, returning any damaged sections to their original structural condition. Survey the condition of the public roadways along truck routes providing access to the proposed project site both before construction and after construction is complete. Complete a before- and after-survey report and submit to the Authority for review, indicating the location and extent of any damage.
7. Maintenance of Public Transit Access and Routes—Coordinate with the appropriate transit jurisdiction before limiting access to public transit and limiting movement of public transit vehicles. Potential actions that would impact access to transit include, but are not limited to, relocating or removing bus stops, limiting access to bus stops or transfer facilities, or otherwise restricting or constraining public transit operations. Maintain public transit access and routing where feasible.
8. Construction Transportation Plan—The design-build contractor shall prepare a detailed Construction Transportation Plan (CTP) for the purpose of minimizing the impact of construction and construction traffic on adjoining and nearby roadways. Prepare the CTPs in close consultation with the pertinent city or county. The Authority must review and approve the Plan before commencing any construction activities. This plan will address, in detail, the activities to be carried out in each construction phase, with the requirement of maintaining traffic flow during peak travel periods. Such activities include, but are not limited to, the routing and scheduling of materials deliveries, materials staging and storage areas, construction employee arrival and departure schedules, employee parking locations, and temporary road closures, if any. The plan will provide traffic controls pursuant to the *California Manual on Uniform Traffic Control Devices* sections on temporary traffic controls (Caltrans 2012) and will include a traffic control plan that includes, at a minimum, the following elements:
   - Temporary signage to alert drivers and pedestrians to the construction zone.
   - Flag persons or other methods of traffic control.
   - Traffic speed limitations in the construction zone.
   - Temporary road closures and provisions for alternative access during the closure.
   - Detour provisions for temporary road closures—alternating one-way traffic will be considered as an alternative to temporary closures where practicable and where it would result in better traffic flow than would a detour.
   - Identified routes for construction traffic.
   - Provisions for safe pedestrian and bicycle passage or convenient detour.
   - Provisions to minimize access disruption to residents, businesses, customers, delivery vehicles, and buses to the extent practicable—where road closures are required during construction, limit to the hours that are least disruptive to access for the adjacent land uses.
   - Provisions for farm equipment access.
   - Provisions for 24-hour access by emergency vehicles.
   - Safe vehicular and pedestrian access to local businesses and residences during construction—The plan will provide for scheduled transit access where construction would otherwise impede such access. Where an existing bus stop is within the work zone, the design-builder will provide a temporary bus stop at a convenient location away from where construction is occurring. Adequate measures will be taken to separate students and parents walking to and from the temporary bus stop from the construction zone.

- – Advance notification to the local school district of construction activities and rigorously maintained traffic control at all school bus loading zones, to ensure the safety of school children. Review existing or planned Safe Routes to Schools with school districts and emergency responders to incorporate roadway modifications that maintain existing traffic patterns and fulfill response route and access needs during project construction and HSR operations.
- – Identification and assessment of the potential safety risks of project construction to children, especially in areas where the project is located near homes, schools, day care centers, and parks.
- – Promotion of child safety within and near the project area. For example, crossing guards could be provided in areas where construction activities are located near schools, day care centers, and parks.
- – CTPs will consider and account for the potential for overlapping construction from reasonably foreseeable projects.
- – CTPs will also include Project Design Features 1-7 and 9-13.

9. Construction during Special Events—Provide a mechanism to prevent roadway construction activities from reducing roadway capacity during major athletic events or other special events that attract a substantial number of visitors. Mechanisms include the presence of police officers directing traffic, special-event parking, use of within-the-curb parking, or shoulder lanes for through-traffic, traffic cones, and so on. Maintain roadway capacity through such mechanisms.
10. Protection of Freight and Passenger Rail during Construction—Repair any structural damage to freight or public railways, and return any damaged sections to their original structural condition. If necessary, during construction, a "shoofly" track would be constructed to allow existing train lines to bypass any areas closed for construction activities. Upon completion, tracks would be opened and repaired; or new mainline track would be constructed, and the "shoofly" would be removed.
11. Off Peak Hour Employee Work Shift Changes at HMF *[as applicable to HMF-related sections or the HMF project]*—Work shifts for the HMF facilities will be timed to not coincide with local peak hour periods. When the HMF employees arrive and depart, they will do so during a non-peak period for local traffic, and total volumes on the roads during shift changes will be less than the volumes that occur during the local peak periods.
12. Identify any additional features required by cities within the study corridor.

Air Quality and Global Climate Change

- Cover trucks to reduce significant fugitive dust emissions while hauling soil and other similar material.
- Wash all trucks and equipment before exiting the construction site.
- Water exposed surfaces and unpaved roads three times daily.
- Reduce vehicle travel speed on unpaved roads to 15 miles per hour.
- Suspend any dust-generating activities when wind speed exceeds 25 mph.
- Stabilize all disturbed areas, including storage piles that are not being actively used for construction purposes to effectively control dust emissions using water or a chemical stabilizer/suppressant, or covered with a tarp or other suitable cover or vegetative ground cover. In areas adjacent to organic farms, the Authority will use non-chemical means of dust suppression.

- Stabilize all onsite unpaved roads and offsite unpaved access roads to effectively control dust emissions using water or a chemical stabilizer/suppressant. In areas adjacent to organic farms, the Authority will use non-chemical means of dust suppression.
- Apply water or presoak all land clearing, grubbing, scraping, excavation, land leveling, grading, cut and fill, and demolition activities to effectively control fugitive dust emissions.
- For buildings up to six stories in height, wet all exterior surfaces of buildings during demolition
- Cover or effectively wet all materials transported offsite to limit visible dust emissions—maintain at least 6 inches of freeboard space from the top of the container
- Limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at the end of each workday of all operations. (The use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting to limit the visible dust emissions. Use of blower devices is expressly forbidden.)
- Apply sufficient water or a chemical stabilizer/suppressant after the addition of materials to, or the removal of materials from, the surface of outdoor storage piles to effectively control fugitive dust emissions. With the demolition of buildings up to six stories in height, all exterior surfaces of the buildings will be wetted during demolition.
- Immediately remove trackout that extends 50 or more feet from the site and at the end of each workday within urban areas.
- Prevent carryout and trackout at any site with 150 or more vehicle trips per day.
- Use low-volatile organic compound (VOC) paint that contains less than 10 percent of VOC contents (VOC, 10%).
- Use a Super-compliant or Clean Air paint that has a lower VOC content than those required by South Coast Air Quality Management District Rule 1113 when available.

Noise and Vibration

Consider avoidance and minimization measures consistent with the Statewide and Bay Area to Central Valley Program EIR/EIS commitments. For example, the use of continuous welded rail would reduce the impact sounds of the steel wheels on the rail gaps, and the use of cowlings (streamlined coverings) on the pantographs would reduce the aerodynamic noise. Comply with Federal Transit Administration and FRA guidelines for minimizing construction noise and construction vibration impacts at sensitive receptors.

Electromagnetic Fields and Electromagnetic Interference

Adhere to international guidelines and comply with applicable federal and state laws and regulations. Similarly, project design will follow the Electromagnetic Compatibility Control Program Plan (EMCPP) to avoid electromagnetic interference (EMI) and to ensure HSR operational safety. Some features of the EMCPP include:

- During the planning stage through system design, the Authority will perform EMC/EMI safety analyses, which will include identification of existing nearby radio systems, design of systems to prevent EMI with identified neighboring uses, and incorporation of these design requirements into bid specifications used to procure radio systems.
- Pipelines and other linear metallic objects that are not sufficiently grounded through the direct contact with earth would be separately grounded in coordination with the affected owner or utility to avoid possible shock hazards. For cases where metallic fences are purposely electrified to inhibit livestock or wildlife from traversing the barrier, specific insulation design measures would be implemented.

- HSR standard corrosion protection measures would be implemented to eliminate risk of substantial corrosion of nearby metal objects.
- The Authority will work with the engineering departments of railways parallel the HSR to apply the standard design practices to prevent interference with the electronic equipment operated by these railroads. Design provisions to prevent interference would be put in place and determined to be adequately effective prior to the activation of potentially interfering systems of the HSR.
- The Authority will include electromagnetic compatibility requirements and design provisions in the Systems Bid Specifications and Construction Bid Specifications for all system and construction procurements that raise electromagnetic compatibility issues. The Bid Specification Electromagnetic Compatibility Requirements require each affected supplier and contractor to develop, deliver, and follow an EMCPP; use and document appropriate EMC design guidelines, criteria, and methods in its equipment and construction; perform required EMC analysis and reporting; and perform required EMC testing.

Typical electromagnetic field (EMF)/EMI mitigation measures that may apply to the EIR/EIS include:

- Protect workers with implanted medical devices
- Protect specific sensitive equipment in facilities near the HSR alignment

Public Utilities and Energy

The HSR project design incorporates precautions to avoid existing utilities and design elements that minimize electricity consumption (e.g., using regenerative braking, energy-saving equipment on rolling stock and at station facilities, implementing energy saving measures during construction, and Automatic Train Operations to maximize energy efficiency during operations), and the project would not overburden utility services. The Authority has also adopted a sustainability policy that includes the project design and construction requirements that avoid and minimize impacts.

Where necessary, coordinate project design and phasing of construction activities with service providers to minimize or avoid interruptions, such as may result from upgrades of existing power lines to connect the HSR System to existing electric/power substations. Where relocating an irrigation facility is necessary, ensure the new facility is operational prior to disconnecting the original facility, where feasible. Prior to construction in areas where utility service interruptions are unavoidable, the contractor would notify the public through a combination of communication media (e.g., by phone, email, mail, newspaper notices, or other means) within that jurisdiction and the affected service providers of the planned outage. The notification would specify the estimated duration of the planned outage and would be published no fewer than 7 days prior to the outage. Construction would be coordinated to avoid interruptions of utility service to hospitals and other critical users.

Biological Resources and Wetlands

Develop project design and construction features to avoid and minimize potential impacts and effects on biological resources. During project design and construction, the Authority and FRA would implement measures to reduce impacts on air quality and hydrology based on applicable design standards. Implementation of these measures would also reduce impacts to biological resources. List the design standards applicable to the project in Volume 2, Appendix 2-D.

Hydrology and Water Resources

During HSR project design and construction, the Authority and FRA would ensure that the measures outlined below are implemented as part of the project to reduce impacts on water resources. List the applicable design standards for hydrology and water resources that would be

used for the HSR project in Volume 2, Appendix 2-D. These measures and standards are discussed in greater detail in supporting documents prepared for the preliminary design, including the following:

- Authority *Technical Memorandum 2.6.5 Hydraulics and Hydrology Guidelines*
- *HSR Section Hydrology, Hydraulics, and Drainage Report*
- *HSR Section Floodplains Impact Report*
- *HSR Section Stormwater Quality Management Report*

Additionally, the project would require an Individual Section 404 Permit from USACE, which would have conditions to further minimize water quality impacts.

- Project Design Features for Stormwater Management and Treatment—During the detailed design phase, evaluate each receiving stormwater system's capacity to accommodate project runoff for the design storm event. As necessary, design onsite stormwater management measures, such as detention or selected upgrades to the receiving system, to provide adequate capacity and to comply with the design standards in Appendix 2-D and the latest version of Authority Technical Memorandum *2.6.5 Hydraulics and Hydrology Guidelines*. Design and construct onsite stormwater management facilities to capture runoff and provide treatment prior to discharge of pollutant-generating surfaces, including station parking areas, access roads, new road over- and underpasses, reconstructed interchanges, and new or relocated roads and highways. Use low-impact development techniques to detain runoff onsite and to reduce offsite runoff. Use constructed wetland systems, biofiltration and bioretention systems, wet ponds, organic mulch layers, planting soil beds, and vegetated systems (biofilters), such as vegetated swales and grass filter strips, where appropriate. Use portions of the HMF site for onsite infiltration of runoff, if feasible, or for stormwater detention if not feasible *[as applicable to HMF-related sections or the HMF project]*. Build stormwater infiltration or detention facilities in compliance with the design standards indicated in Appendix 2-D. Use vegetated set-backs from streams.
- Project Design Features for Flood Protection—Design the project to both remain operational during flood events and to minimize increases in 100-year or 200-year flood elevations, as applicable to locale. Design standards will include the following:
  - Establish track elevation to prevent saturation and infiltration of stormwater into the sub-ballast.
  - Minimize development within the floodplain, to such an extent that water surface elevation in the floodplain would not increase by more than 1 foot, or as required by state or local agencies, during the 100-year or 200-year flood flow [as applicable to locale]. Avoid placement of facilities in the floodplain or raise the ground with fill above the base-flood elevation.

  Design the floodplain crossings to maintain a 100-year floodwater surface elevation of no greater than 1 foot above current levels, or as required by state or local agencies, and project features within the floodway itself will not increase existing 100-year floodwater surface elevations in Federal Emergency Management Agency-designated floodways, or as otherwise agreed upon with the county floodplains manager.

  The following design standards would minimize the effects of pier placement on floodplains and floodways:

  - Design site crossings to be as nearly perpendicular to the channel as feasible to minimize bridge length.
  - Orient piers to be parallel to the expected high-water flow direction to minimize flow disturbance.

- Elevate bridge crossings at least 3 feet above the high-water surface elevation to provide adequate clearance for floating debris, or as required by local agencies. [The Central Valley Flood Protection Board requires that the bottom members (soffit) of a proposed bridge be at least 3 feet above the design floodplain. The required clearance may be reduced to 2 feet on minor streams at sites where significant amounts of stream debris are unlikely. Check the requirements of the local or regional floodway regulatory authority for specifications applicable to the HSR section.]
- Conduct engineering analyses of channel scour depths at each crossing to evaluate the depth for burying the bridge piers and abutments. Implement scour-control measures to reduce erosion potential.
- Use quarry stone, cobblestone, or their equivalent for erosion control along rivers and streams, complemented with native riparian plantings or other natural stabilization alternatives that would restore and maintain a natural riparian corridor.
- Place bedding materials under the stone protection at locations where the underlying soils require stabilization as a result of stream-flow velocity.

- Construction Stormwater Pollution Prevention Plan—The State Water Resources Control Board (SWRCB) Construction General Permit (Order No. 2009-0009 DWQ, NPDES No. CAS000002) establishes three project risk levels that are based on site erosion and receiving-water risk factors. Risk Levels 1, 2, and 3 correspond to low-, medium-, and high-risk levels for a project. A preliminary analysis indicates that most of the project would fall under Risk Level 1, the lowest risk level. However, sections of the project may be more appropriately categorized as Risk Level 2 due to the combination of local rainfall, soil erodibility, and the lengths of the constructed slopes. For example, the portion of the project draining to Kings River would fall under Risk Level 2. Risk Level 2 measures also would be carried out anywhere in the project vicinity where construction activities are conducted within or immediately adjacent to sensitive environmental areas, such as streams, wetlands, and vernal pools.

  The Construction General Permit requires preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP), which would provide best management practices (BMP) to minimize potential short-term increases in sediment transport caused by construction, including erosion control requirements, stormwater management, and channel dewatering for affected stream crossings. These BMPs will include measures to provide permeable surfaces where feasible and to retain or detain and treat stormwater onsite. Other BMPs include strategies to manage the overall amount and quality of stormwater runoff. The Construction SWPPP will include measures to address, but are not limited to, the following:

  - Hydromodification management to ensure maintenance of pre-project hydrology by emphasizing onsite retention of stormwater runoff using measures such as flow dispersion, infiltration, and evaporation, supplemented by detention, where required. Additional flow control measures will be implemented where local regulations or drainage requirements dictate.
  - Implementing practices to minimize the contact of construction materials, equipment, and maintenance supplies with stormwater.
  - Limiting fueling and other activities using hazardous materials to areas distant from surface water, providing drip pans under equipment, and daily checks for vehicle condition.
  - Implementing practices to reduce erosion of exposed soil, including soil stabilization, watering for dust control, perimeter silt fences, and sediment basins.

- Implementing practices to maintain current water quality including silt fences, stabilized construction entrances, grass buffer strips, ponding areas, organic mulch layers, inlet protection, and storage tanks and sediment traps to settle sediment.
- Implementing practices to capture and provide proper offsite disposal of concrete washwater, including isolation of runoff from fresh concrete during curing to prevent it from reaching the local drainage system, and possible treatment with dry ice or other acceptable means to reduce the alkaline character of the runoff (high pH) that typically results from new concrete.
- Developing and implementing a spill prevention and emergency response plan to handle potential fuel or other spills.
- Using diversion ditches to intercept offsite surface runoff.
- Where feasible, avoiding areas that may have substantial erosion risk, including areas with erosive soils and steep slopes.
- Where feasible, limiting construction to dry periods when flows in water bodies are low or absent.

Implementation of a SWPPP is the responsibility of the construction contractor's Qualified SWPPP Practitioner or designee. As part of that responsibility, the effectiveness of construction BMPs must be monitored before and after storm events. Records of these inspections and monitoring results are submitted to the SWRCB/regional water quality control board (RWQCB) as part of the annual report required by the Statewide Construction General Permit. The reports are available to the public online. The SWRCB and RWQCB have the opportunity to review these documents.

- Regional Dewatering Permit—The Central Valley RWQCB, Order No. R5-2008-0081, *Waste Discharge Requirements General Order for Dewatering and Other Low Threat Discharges to Surface Waters*, is a permit that covers construction dewatering discharges and some other listed discharges that do not contain significant quantities of pollutants, and that either (1) are 4 months, or less, in duration or (2) have an average dry-weather discharge that does not exceed 0.25 million gallons per day. [Refer to RWQCB order number applicable to the HSR section.]
- Flood Protection—The Central Valley Flood Protection Board (CVFPB) regulates specific river, creek, and slough crossings for flood protection. [Check the requirements of the local or regional floodway regulatory authority for jurisdiction applicable to the HSR section.] These crossings must meet the provisions of California Code of Regulations, Title 23. Title 23 requires that new crossings maintain hydraulic capacity through such measures as in-line piers, adequate streambank height (freeboard), and measures to protect against streambank and channel erosion. Section 208.10 requires that improvements, including crossings, be constructed in a manner that does not reduce the channel's capacity or functionality, or that of any federal flood control project. The CVFPB reviews applications for encroachment permits for approval of a new channel crossing or other channel modification. For a proposed crossing or placement of a structure near a federal flood control project, the CVFPB coordinates review of the encroachment permit application with USACE pursuant to assurance agreements with USACE and the USACE Operation and Maintenance Manuals under 33 C.F.R. Part 208.10 and 33 U.S.C. § 408. Under Section 408 of the Rivers and Harbors Act, USACE must approve any proposed modification that involves a federal flood control project. A Section 408 permit would be required if construction modifies a federal levee. A Section 208.10 permit would be required where the project crosses the right-of-way of a federal facility or interferes with its operation or maintenance without changing the system's structural geometry or hydraulic capacity.

- Industrial Stormwater Pollution Prevention Plan—The stormwater general permit (Order No. 97-03-DWQ, NPDES No. CAS000001) requires preparation of a SWPPP and a monitoring plan for industrial facilities that discharge stormwater from the site, including vehicle maintenance facilities associated with transportation operations. The permit includes performance standards for pollution control. The HMF would meet the stormwater treatment requirements of the Industrial General Permit.
- Maintain Pre-project Hydrology—Avoid increasing existing peak stormwater flows from the project site. This will be accomplished by emphasizing onsite retention of stormwater runoff using measures such as flow dispersion, infiltration, and evaporation, supplemented by detention, where required. Additional flow control measures could be implemented where local regulations or drainage requirements dictate.

Geology, Soils, Seismicity and Paleontological Resources

Conduct site-specific geotechnical investigations as design work progresses so that the project can incorporate site-specific engineering solutions that adhere to regional and national technical standards and codes into the design to reduce risks associated with the geology, soils, and seismicity. List applicable design standards for Geology, Soils, Seismicity and Paleontological Resources that would be used for the project in Volume 2, Appendix 2-D. The technical standards and codes include the following:

- 2010 American Association of State Highway and Transportation Officials (AASHTO) Load Resistance Factor Designs Bridge Design Specifications and the 2009 AASHTO Guide Specifications for Load Resistance Factor Designs Seismic Bridge Design—These documents provide guidance for characterization of soils, as well as methods to be used in the design of bridge foundations and structures, retaining walls, and buried structures. These design specifications will provide minimum specifications for evaluating the seismic response of the soil and structures.
- Federal Highway Administration Circulars and Reference Manuals—These documents provide detailed guidance on the characterization of geotechnical conditions at sites, methods for performing foundation design, and recommendations on foundation construction. These guidance documents include methods for designing retaining walls used for retained cuts and retained fills, foundations for elevated structures, and at-grade segments. Some of the documents include guidance on methods of mitigating geologic hazards that are encountered during design.
- American Railway Engineers and Maintenance of Way Association (AREMA) Manual—These guidelines deal with rail systems. Although they cover many of the same general topics as AASHTO, they are more focused on best practices for rail systems. The manual includes principles, data, specifications, plans, and economics pertaining to the engineering, design, and construction of railways.
- California Building Code—This code is based on the 2009 International Building Code (IBC). This code contains general building design and construction requirements relating to fire and life safety, structural safety, and access compliance.
- IBC and American Society of Civil Engineers (ASCE) 7—These codes and standards provide minimum design loads for buildings and other structures. They will be used for the design of the maintenance facilities and stations. Sections in IBC and ASCE 7 provide minimum requirements for geotechnical investigations, levels of earthquake ground shaking, minimum standards for structural design, and inspection and testing requirements.
- Caltrans Design Standards—Caltrans has specific minimum design and construction standards for all aspects of transportation system design, ranging from geotechnical explorations to construction practices. These amendments provide specific guidance for the design of deep foundations that are used to support elevated structures, for design of mechanically

stabilized earth walls used for retained fills, and for design of various types of cantilever (e.g., soldier pile, secant pile, and tangent pile) and tie-back walls used for retained cuts.

- Caltrans Construction Manuals—Caltrans has a number of manuals including *Field Guide to Construction Dewatering*, *Caltrans Construction Site Best Management Practices (BMPs) Manual,* and *Construction Site Best Management Practice (BMP) Field Manual and Troubleshooting Guide* that provide guidance and Best Management Practices for dewatering options and management, erosion control and soil stabilization, non-storm water management, and waste management at construction sites.
- ASTM (formerly American Society for Testing and Materials)—ASTM has developed standards and guidelines for all types of material testing—from soil compaction testing to concrete-strength testing. The ASTM standards also include minimum performance requirements for materials. Most of the guidelines and standards cited above use ASTM or a corresponding series of standards from AASHTO to ensure that quality is achieved in the constructed project.

Conduct site-specific geotechnical investigations to manage geologic, soils, and seismic hazards, . Based on that information, implement the following specific measures to reduce and avoid impacts during construction and operation. These practices include the following:

- Limit Groundwater Withdrawal—Control the amount of groundwater withdrawal from the project, re-inject groundwater at specific locations if necessary, or use alternate foundation designs to offset the potential for settlement. This control is important for locations with retained cuts in areas where high groundwater exists, and where existing buildings are located near the depressed track section.
- Monitor Slopes—Incorporate slope monitoring into final design where a potential for long-term instability exists from gravity or seismic loading. This practice is important near at-grade sections where slope failure could result in loss of track support or where slope failure could result in additional earth loading to foundations supporting elevated structures.
- Conduct Geotechnical Inspections—Prior to and throughout construction, conduct geotechnical inspections to verify that no new, unanticipated conditions are encountered and to determine the locations of unstable soils in need of improvement.
- Improve Unstable Soils—Employ various methods to mitigate for the risk of ground failure from unstable soils. If the soft or loose soils are shallow, they can be excavated and replaced with competent soils. To limit the excavation depth, replacement materials can also be strengthened using geosynthetics. Where unsuitable soils are deeper, use ground improvement methods, such as stone columns, cement deep-soil-mixing (CDSM), or jet-grouting. Alternatively, if sufficient construction time is available, use preloading—in combination with prefabricated vertical drains (wicks) and staged construction—to gradually improve the strength of the soil without causing bearing-capacity failures. Both over-excavation and ground improvement methods have been successfully used to improve similar soft or loose soils. Lime treatment of heavy rail subgrades over soft soils has also been used successfully in the San Joaquin Valley. The application of these methods is most likely at stream and river crossings, where soft soils could occur; however, localized deposits could occur at other locations along the alignment. The ground improvement or over-excavation methods may also be necessary at the start of approach fills for elevated track sections or retained-earth segments of the alignment if the earth loads exceed the bearing capacity of the soil. Alternatively, at these locations, earth fills might be replaced by lightweight fill, such as lightweight concrete, extruded polystyrene (geofoam), or short columns, and cast-in-drilled hole (CIDH) piles might be used to support the transition from the elevated track to the at-grade alignment.

- Improve Settlement-Prone Soils—Improve settlement-prone soils prior to facility construction. Ground improvement is used to transfer new earth loads to deeper, more competent soils. Another alternative is to use preloads and surcharges with wick drains to accelerate settlement in areas that are predicted to undergo excessive settlement. By using the preload and surcharge with wick drains, settlement would be forced to occur. The application of these methods is most likely at stream and river crossings, where soft soils are more likely to occur. Where groundwater is potentially within 50 feet of the ground surface, any below-ground excavations use well points in combination with sheet pile walls to limit the amount of settlement of adjacent properties from temporary water drawdown. Alternately, water can be re-injected to make up for localized water withdrawal.
- Prevent Water and Wind Erosion—Many mitigation methods exist for controlling water and wind erosion of soils. These include the use of straw bales and mulches, revegetation, and covering areas with geotextiles. Where the rate of water runoff could be high, riprap and riprap check dams could be used to slow the rate of water runoffs. Other BMPs for water are discussed in Section 3.8, Hydrology and Water Resources. Implementation of these methods is important where large sections of earth are exposed during construction, such as for retained-cut design segments.
- Modify or Remove and Replace Soils with Shrink-Swell Potential and Corrosion Characteristics—One option is to excavate and replace soils that represent the highest risk. In locations where shrink-swell potential is marginally unacceptable, soil additives will be mixed with existing soil to reduce the shrink-swell potential. The decision whether to remove or treat the soil is made on the basis of specific shrink-swell potential or corrosivity characteristics of the soil, the additional costs for treatment versus excavation and replacement, as well as the long-term performance characteristics of the treated soil. This practice is important for at-grade segments of the alignment because these are most likely to be affected by shrink-swell potential or corrosive soils.
- Evaluate and Design for Large Seismic Ground Shaking—Prior to final design, additional seismic studies will be conducted to establish the most up-to-date estimation of levels of ground motion. Updated Caltrans seismic design criteria will be used in the design of any structures supported in or on the ground. These design procedures and features reduce the potential that moments, shear forces, and displacements that result from inertial response of the structure will lead to collapse of the structure. In critical locations, pendulum base isolators can reduce the levels of inertial forces. New composite materials can enhance seismic performance.
- Evaluate and Design for Secondary Seismic Hazards—As discussed above, various ground improvement methods can be implemented to mitigate the potential for liquefaction, liquefaction-induced lateral spreading or flow of slopes, or post-earthquake settlement. Ground improvement around CIDH piles improves the lateral capacity of the CIDH during seismic loading. CDSM, stone columns, flow attenuation drains (e.g., EQ drains), or jet-grouting develop resistance to lateral flow or spreading of liquefied soils.
- Suspend Operations during or after an Earthquake—Install motion-sensing instruments to provide ground-motion data; install a control system to shut down HSR operations temporarily during or after a potentially damaging earthquake to reduce risks. Install monitors at select locations where high ground motions could damage the HSR track system. Candidate locations would include, but are not limited to, elevated guideways and retained-earth, retained-cut, and at-grade segments.

Hazardous Materials and Wastes

List applicable design standards for hazardous materials and waste that would be used for the project in Volume 2, Appendix 2-D.

These design features would minimize impacts due to hazardous materials as they relate to the proper transport, storage, use and disposal of hazardous materials, preparation of plans to handle unforeseen spills or undocumented contamination to reduce the exposure of workers and the public and the spread of contaminants, and specific investigation of properties before acquisition to remove or avoid contaminated areas to reduce exposure of workers and the public to hazardous material.

- Handle, transport, and dispose of materials and wastes in accordance with applicable state and federal regulations, such as Resource Conservation and Recovery Act, Comprehensive Environmental Response, Compensation, and Liability Act, the Hazardous Materials Release Response Plans and Inventory Law, and the Hazardous Waste Control Act (see Section 3.3, Air Quality and Global Climate Change, for regulations applying to hazardous air pollutants).
- During the property acquisition process, analyze properties acquired for construction of the HSR, as needed, including title searches, and determine which properties require further assessment for hazardous material contamination. During the right-of-way acquisition phase, conduct Phase 1 environmental site assessments in accordance with standard ASTM methodologies to characterize each site. The determination of parcels that require soil testing and the locations for testing would be informed by the Phase 1 environmental site assessment and made in coordination with state and local agency officials. Testing and appropriate remediation would be conducted prior to acquisition. Remediation activities may include removal of contamination, in-situ treatment, or soil capping in full compliance with applicable state and federal laws and regulations.
- Implement methane protection measures for all work within 1,000 feet of a landfill, including gas detection systems and personnel training, pursuant to Title 27, the hazardous materials contingency plan, and BMPs.
- Nominal design variances, such as the addition of a plastic barrier beneath the ballast material to limit the potential release of volatile subsurface contaminants, may be implemented in conjunction with site investigation and remediation.
- Develop a construction management plan that includes provisions for the disturbance of undocumented contamination. The Authority is aware that undocumented contamination could be encountered during construction activities and is committed to work closely with local agencies to resolve any such encounters.
- Prepare demolition plans for the safe dismantling and removal of building components and debris. The demolition plans will include a plan for lead and asbestos abatement.
- Implement a Spill Prevention, Control, and Countermeasure (SPCC) plan or, for smaller quantities, a spill prevention and response plan that prescribes BMPs to follow to clean up any hazardous material release. During operation of the HSR, hazardous materials monitoring plans, such as a hazardous materials business plan and an SPCC plan, will be implemented.
- Comply with the State Water Resources Control Board Construction General Permit conditions and requirements for transport, labeling, containment, cover, and other BMPs for storage of hazardous materials during construction.
- To the extent feasible, the Authority is committed to identifying, avoiding, and minimizing hazardous substances in the material selection process for construction, operation, and maintenance of the HSR System. The Authority will use an Environmental Management System to evaluate the full inventory of hazardous materials employed on an annual basis and will replace hazardous substances with nonhazardous materials to the extent possible. These standards and material specifications would aid in promoting safety for passengers and employees.

Safety and Security

List applicable design standards for safety and security that would be used for the project in Volume 2, Appendix 2-D. The standard engineering design guidelines and regulatory requirements include the following:

- Final design includes development of a detailed construction transportation plan that would include coordination with local jurisdictions on emergency vehicle access. The plan would establish procedures for temporary road closures including: access to residences and businesses during construction, lane closure, signage and flag persons, temporary detour provisions, alternative bus and delivery routes, emergency vehicle access, and alternative access locations.
- Engineering design and construction phases include preliminary hazard analysis (PHA), collision hazard analysis (CHA), and threat and vulnerability assessment (TVA) methods.
  - PHAs follow the U.S. Department of Defense's System Safety Program Plan Requirements (MIL-STD-882) to identify and determine the facility hazards and vulnerabilities so that they can be addressed by—and either eliminated or minimized—the design.
  - CHAs follow the FRA's *Collision Hazard Analysis Guide: Commuter and Intercity Passenger Service* (FRA 2007) which provides a step-by-step procedure on how to perform a hazard analysis and how to develop effective mitigation strategies that will improve passenger rail safety.
  - TVAs establish provisions for the deterrence and detection of, as well as the response to, criminal and terrorist acts for rail facilities and system operations. Provisions include right-of-way fencing, intrusion detection, security lighting, security procedures and training, and closed-circuit televisions. Intrusion-detection technology could also alert to the presence of inert objects, such as toppled tall structures or derailed freight trains, and stop HSR operations to avoid collisions.
- Construction safety and health plans (CSHP) establish the minimum safety and health guidelines for contractors of, and visitors to, construction projects. CSHPs require contractors to develop and implement site-specific measures that address regulatory requirements to protect human health and property at construction sites.
- Fire/life safety programs (FLSP) implement any applicable federal and state requirements that address the safety of passengers and employees during emergency response. FLSPs are intended to promote fire and life safety and security in system design, construction, and implementation. FLSP would be coordinated with local emergency response organizations to provide them with an understanding of the rail system, facilities, and operations, and to obtain their input for modifications to emergency response operations and facilities, such as evacuation routes. The Authority is committed to establishing FLSPs throughout the HSR section and would ensure that FLSPs address the needs of disabled persons.
- System security plans address design features intended to maintain security at the stations within the track right-of-way, at stations, and onboard trains. The design standards and guidelines require emergency walkways on both sides of the tracks for both elevated and at-grade sections. Adequate space would be present along at-grade sections of the alignment to allow for emergency response access. Ground access would be available for elevated tracks where access to ground equipment is required. This ground access could be used in the event of an emergency. Additional ground access would be considered, consistent with fire and rescue procedures, and where practical operational standards include a system-specific police force.
- Standard operating procedures and emergency operating procedures include industry best practices, such as the FRA-mandated Roadway Worker Protection Program. They address the

day-to-day operation and emergency situations to maintain the safety of employees, passengers, and the public.

- System safety program plans (SSPP) incorporate FRA requirements and are implemented upon FRA approval. FRA's SSPPs requirements will be determined in FRA's new System Safety Regulation (Docket No. FRA-2011-0060-1), which has not yet been finalized. SSPPs are based on the principles outlined in *The Manual for Development of System Safety Program Plans for Commuter Railroads* (American Public Transportation Association 2006) and address project design, construction, testing, and operation.
- Rail systems must comply with FRA requirements for tracks, equipment, railroad operating rules, and practices, including the passenger equipment safety standards (49 C.F.R. Part 238), *Highway-Rail Grade Crossing Guideline for the High-Speed Passenger Rail* (FRA 2009), and track safety standards (49 C.F.R. Part 213). Requirements include warning systems and barrier systems to enhance track safety.
- Worker safety in the workplace is generally governed by the Occupational Health and Safety Act of 1970, which established the Occupational Safety and Health Administration (OSHA). OSHA establishes standards and oversees compliance with workplace safety and reporting of injuries and illnesses of employed workers. In California, OSHA enforcement of workplace requirements is performed by Cal OSHA. Under Cal OSHA regulations, as of July 1, 1991, every employer must establish, implement, and maintain an injury and illness prevention program.
- The HSR *Urban Design Guidelines* (Authority 2011) require implementing the principles of crime prevention through environmental design. This is a design method that focuses on reducing opportunities for crime through the design and management of the physical environment. Consider four basic principles of crime prevention through environmental design during station and site planning: territoriality (design physical elements that express ownership of the station or site); natural surveillance (arrange physical features to maximize visibility); improved sightlines (provide clear views of surrounding areas); and access control (provide physical guidance for people coming and going from a space). The HSR design includes emergency access to the rail right-of-way, and elevated HSR structure design includes emergency egress points.
- All active and abandoned oil and gas wells within 200 feet of the HSR tracks would be identified. All active wells would be abandoned in accordance with the California Department of Conservation, Division of Oil, Gas and Geothermal Resources (DOGGR) standards in coordination with the well owner, and these wells would be relocated farther than 200 feet from the HSR tracks. In the event that relocated wells do not attain the current production rates of the active wells that are abandoned, the Authority would be responsible for compensating the well owner for lost production. All abandoned wells within 200 feet of the HS tracks would be inspected and re-abandoned, as necessary, in accordance with DOGGR standards and in coordination with the well owner.
- All work within 1,000 feet of a landfill would require methane protection measures, including gas detection systems and personnel training, pursuant to Title 27, the hazardous materials contingency plan, and BMPs.

Socioeconomics and Communities

The Authority will require that the design-build contractor develop and implement a construction management plan to address communications, community impacts, visual protection, air quality, safety controls, noise controls, and traffic controls to minimize impacts on low-income households and minority populations. The plan will ensure property access is maintained for local businesses, residences, and emergency services. This plan will include maintaining customer and vendor access to local businesses throughout construction by using signs to instruct customers about

access to businesses during construction. In addition, the plan will include efforts to consult with local transit providers to minimize impacts on local and regional bus routes in affected communities. Construction management plans are standard for large infrastructure projects such as this one, and are considered effective in minimizing community impacts.

The Authority must comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act, as amended (Uniform Act). The provisions of the Uniform Act, a federally mandated program, would apply to all acquisitions of real property or displacements of persons resulting from this federally assisted project. It was created to provide for and ensure fair and equitable treatment of all affected persons. Additionally, the Fifth Amendment of the U.S. Constitution provides that private property may not be taken for a public use without payment of "just compensation."

The Uniform Act requires that the owning agency provide notification to all affected property owners of the agency's intent to acquire an interest in their property. This notification includes a written offer letter of just compensation. A right-of-way specialist is assigned to each property owner to assist him or her through the acquisition process. The Uniform Act also provides benefits to displaced individuals to assist them financially and with advisory services related to relocating their residence or business operation. Benefits are available to both owner occupants and tenants of either residential or business properties.

The Uniform Act requires provision of relocation benefits to all eligible persons regardless of race, color, religion, sex, or national origin. Benefits to which eligible owners or tenants may be entitled are determined on an individual basis and explained in detail by an assigned right-of-way specialist.

The California Relocation Assistance Act essentially mirrors the Uniform Act and also ensures consistent and fair treatment of property owners. However, because the project will receive federal funding, the Uniform Act takes precedence. Owners of private property have federal and state constitutional guarantees that their property will not be acquired or damaged for public use unless owners first receive just compensation. Just compensation is measured by the "fair market value," where the property value is considered to be the highest price that would be negotiated on the date of valuation. The value must be agreed upon by a seller who is willing, not obliged to sell, but under no particular or urgent necessity and by a buyer who is ready, willing, and able to buy but under no particular necessity. Both the owner and the buyer must deal with the other with the full knowledge of all the uses and purposes for which the property is reasonably adaptable and available (Code of Civil Procedure Section 1263.320a).

The Authority has developed more detailed information about how it plans to comply with the Uniform Act and the California Relocation Assistance Act. The Authority has developed three detailed relocation assistance documents modeled after Caltrans versions. The documents are listed below and included in Appendix 3.12-A:

- *Your Rights and Benefits as a Displacee under the Uniform Relocation Assistance Program (Residential)*
- *Your Rights and Benefits as a Displacee under the Uniform Relocation Assistance Program (Mobile Home)*
- *Your Rights and Benefits as a Displaced Business, Farm, or Nonprofit Organization under the Uniform Relocation Assistance Program*

Before any acquisitions occur, the Authority will develop a relocation mitigation plan, in consultation with affected cities and counties. In addition to establishing a program to minimize the economic disruption related to relocation, the relocation mitigation plan will be written in a style that also enables it to be used as a public-information document.

The plan will be designed to meet the following objectives:

- Provide affected property and business owners and tenants a high level of individualized assistance in situations when relocation is necessary.
- Coordinate relocation activities with other agencies causing displacements in the study area to ensure that all displaced persons receive fair and consistent relocation benefits.
- Make a best effort to minimize the permanent closure of displaced businesses and non-profit agencies as a result of relocations.
- Within the limits established by law and regulation, minimize the economic disruption caused to tenants and residents by relocation.
- In individual situations, where warranted, consider the cost of obtaining the entitlement permits necessary to relocate to a suitable location and take those costs into account when establishing the fair market value of the property.
- Provide those business owners who require complex permitting (such as dairies) with regulatory compliance assistance.

The relocation mitigation plan will include the following components:

- A description of the appraisal, acquisition, and relocation process that describes the activities of the appraisal and relocation specialists, for the benefit of the reader.
- A means of assigning appraisal and relocation staff to affected property owners, tenants, or other residents on an individual basis.
- Individualized assistance to affected property owners, tenants, or other residents in applying for funding, including research to summarize loans, grants, and federal aid available, and research of demographically similar areas for relocation.
- Creation of an ombudsman's position to act as a single point of contact for property owners, residents, and tenants with questions about the relocation process. The ombudsman would also act to address concerns about the relocation process as it applies to the individual situations of property owners, tenants, and other residents.

Relocation mitigation plans are commonly used for large infrastructure projects that displace a large number of residences and businesses, such as this project, and are considered successful in minimizing the impact to individual property owners.

The Authority's *Urban Design Guidelines* include a commitment by the Authority to work closely with communities where a station would be constructed to ensure that TOD policies are implemented. The Authority will develop context sensitive designs by working with local governments to enhance the public benefits of HSR station development so that they meet the needs of the local communities, including more affordable housing and job opportunities. Through the process of providing station area planning funding, the Authority will work collaboratively with cities to plan intensified development around the station sites and promote social equity through measures such as recommendations for a certain percentage of low-income housing units.

Roadway improvements included in the project would improve pedestrian and bicycle safety through associated street widening, traffic restriction, and new traffic signals. Road overcrossing would be built with sidewalks that provide pedestrian and bicycle access across the HSR. This will be substantially safer than many roadway and state route facilities in the project study area that currently cross at-grade with existing railroad tracks. Additionally, the Authority's station area development policies specifically promote compact pedestrian-oriented design to ensure walking, bicycle, and transit access with streetscapes that include landscaping, small parks, and pedestrian spaces.

Station Planning, Land Use, and Development

Although not strictly part of the project design, the Authority has established a certain "zone of responsibility" around the proposed stations. To that end, the Authority prepared *Urban Design Guidelines* (2011)[20] to provide urban planning assistance to achieve great placemaking in the station areas. The guidelines are based on international examples where cities and transit agencies have incorporated sound urban design principles as integrated elements of large-scale transportation systems. The application of sound urban design principles to the HSR system will help to maximize the performance of the transportation investment, enhance the livability of the communities it serves, create long-term value, and sensitively integrate the project into the communities along the HSR system corridor. The Authority and FRA have also provided station planning grants for cities that could have an HSR station to assist land use planning in the areas surrounding the stations.[21]

The Authority and FRA have a strategy for long-term coordination with local transit agencies and cities to develop transit connectivity plans for HSR station areas and for connectivity to neighboring communities where high HSR ridership is projected, which is expected to reduce the overall demand for parking at stations by facilitating alternative methods of station access. The strategy includes the following components:

- Design and construct stations to be pedestrian and bicycle-friendly by incorporating features, such as bike lockers, changing rooms, and showers.
- Facilitate easy transfers between local transit and HSR, such as shared ticketing, wayfinding for local transit within HSR stations, and other features.
- Coordinate transit service and ride-sharing to connect HMF sites to population centers to promote an alternative to single-occupant vehicles for employees' commutes.

Agricultural Farmland and Forest Land

The following design and construction features are considered a part of the HSR project.

- Restoration of Land Used for Temporary Staging Areas—All construction access, mobilization, material laydown, and staging areas on Important Farmlands will be returned to as close to their pre-construction staging condition as possible with the goal of ensuring these parcels remain available for long-term agricultural use. This requirement is included in the design-build construction contract requirements. The construction contractor shall prepare a remediation plan of specific actions, sequence of implementation, parties responsible for implementation and ensuring successful achievement with the remediation plan. Before beginning construction use of sites on Important Farmland, the construction contractor shall submit the remediation plan to the Authority for review and obtain Authority approval.
- Farmland Consolidation Program—The Authority has established and will administer a farmland consolidation program to sell remnant parcels to neighboring landowners for consolidation with adjacent farmland properties. In addition, on request, the program will assist the owners of remnant parcels in selling those remnants to adjacent landowners. The goal of the program is to provide for continued agricultural use on the maximum feasible amount of remnant property that otherwise may be uneconomical to farm. The program will focus on severed remainder parcels, including those that were under Williamson Act or Farmland Security Act contract at the time of right-of-way acquisition and have become too small to remain in the local Williamson Act or Farmland Security Act program. The program will assist landowners in obtaining lot line adjustments where appropriate to incorporate

[20] See Authority website, www.hsr.ca.gov/Programs/Green_Practices/sustainability.html
[21] See Authority website, www.hsr.ca.gov/Programs/Green_Practices/station_communities.html

remnant parcels into a larger parcel that is consistent with size requirements under the local government general plan.

The Authority and FRA expect that productive farmland would be farmed in some manner, and not left idle in perpetuity. The intent of the Farmland Consolidation Program is to take responsibility for the disruptive effects and proactively work to restore remainder parcels to productive agricultural use (and not rely on market forces to accomplish the same result). This process would be a series of real estate transactions, and the Authority would be using the same real property transaction processes used by Caltrans; this process features the use of Authority right-of-way agents who generally follow Caltrans procedures. The State of California has a long history of managing real estate transactions through Caltrans and other state entities (e.g., the Department of General Services), which helps promote the success of the Authority's farmland consolidation program.

- Permit Assistance—The Authority will assign a representative to act as a single point of contact to assist each confined animal facility owner during the process of obtaining new or amended permits or other regulatory compliance necessary to the continued operation or relocation of the facility. The Authority will consider and may provide compensation when acquisition of a confined animal site would either require relocation of the facility or amendment of its existing regulatory permits. The Authority has proposed to create a permit assistance center for landowners and operators whose permits are impacted by the HSR. This permit center will focus on helping the permit holders modify or obtain any new permits that are required as a result of the HSR impacts.
- Research—During the HSR testing phase, the Authority will fund a program to undertake original research on the wind and noise effects of HSR operations on agricultural activities. The Authority will engage qualified researchers within the University of California or California State University system to undertake this research. The researcher will be selected by the Authority through a request for proposal process. The research will include monitoring of noise and wind effects at representative points along the test track. The research period will include the testing phase and extend 2 years after commencement of revenue service. The Authority will publicly distribute a report of the findings of the research program.

  The research should include, but not be limited to, the following subjects:

  – Generated wind speed, duration, and area of influence from HSR trainsets at typical operational speeds
  – Effects of HSR-generated wind on the effectiveness of honey bee pollination
  – Dust production as a result of typical HSR operations, including entrainment and dispersal patterns of dust in the HSR slipstream
  – Generated noise levels and duration from HSR trainsets at typical operational speeds
  – Noise contours depicting modeled noise levels at distance from the tracks
  – Practical methods for reducing effects on agriculture

Parks, Recreation, and Open Space

No project impact avoidance and minimization features are presented in the Merced to Fresno or Fresno to Bakersfield EIR/EIS documents. Features to avoid or minimize impacts to parks, recreation, and open space may be developed during conceptual or preliminary design, alternatives analysis, or Section 4(f) or Section 6(f) analyses for other HSR sections. Typical design measures to avoid or minimize impacts to parks and recreation may include:

- Locate HSR guideway system components to maintain safe and attractive access for present travel modes (e.g., motorists, bicyclists, pedestrians—as applicable) to park and recreation facilities

- Maintain sufficient separation of HSR guideway system and facilities from existing parks, recreation facilities, and open space areas to preserve, to the extent feasible, user experience for intended recreational purpose (e.g., passive recreation, active recreation, wilderness experience)

Aesthetics and Visual Quality

The Authority has adopted design standards and design guidelines that are established to create a minimum aesthetic quality for a long-lasting infrastructure. The Authority's *Urban Design Guidelines for the California High Speed Train Project* (March 2011)[22] discusses the principles of context-sensitive solutions to guide the design of stations. This approach is equally applicable to elevated guideways and will be employed to mitigate visual impacts through context-sensitive design. The Authority Technical Memorandum *Aesthetic Guidelines for Non-Station Structures* (TM 200.06)[23] also guides the design of the HSR components. The Authority *Aesthetic Design Review Process* (TM 200.07) will guide the development of mitigation for non-station area structures. These standards and guidelines work to minimize and avoid aesthetic effects on the adjacent surroundings, where possible.

Cultural Resources

No project impact avoidance and minimization features are presented in the Merced to Fresno or Fresno to Bakersfield EIR/EIS documents. Features to avoid or minimize impacts to cultural resources may be developed during conceptual or preliminary design, alternatives analysis, or analyses and consultation pursuant to Section 4(f), Section 6(f), or Section 106 for other HSR sections.

2.5.3 HSR Build Alternatives—Detailed Description

For each build alternative evaluated in the EIR/EIS, provide an end-to-end detailed text and map description of the **whole of the project**, including route, station site, and maintenance facility alternatives considered for the HSR Section. Present each alternative (e.g., Alternative 1, Alternative 2, Alternative 3,…Alternative N) in a dedicated, third-level (Heading 3) subsection (see the chapter outline in Section 2.11.2). Refer to the preliminary design drawings and materials in Volume 3, Alignments and Other Plans, of the EIR/EIS to show detailed information on track alignments, profiles, structures, typical sections, construction use areas, and other design information. All design information must be sufficiently complete and at the levels of detail and precision to complete all analyses of potential environmental or community impacts, and all regulatory permit applications (e.g., located and quantified areal extents of land disturbance, located and quantified volumetric amounts of excavation or fill). To furnish the design drawing information to the reader, provide the Internet URL to the Authority website or contact information to request a CD/DVD copy. Where specific, objective design or construction details are not available, describe reasonable assumptions, specifications and performance standards for design or construction that will enable complete evaluation of impacts and design of mitigation measures, as warranted.

Provide a representative set of typical sections that illustrate the range of HSR and related infrastructure scenarios (e.g., at-grade, elevated, sub-grade, tunnel guideways), including HSR guideway and OCS features; HSR wayside facilities for traction power, communications, drainage, maintenance, safety and security; and adjacent roadway, highway, railroad and other transportation features (in particular those features that directly affect design of HSR features and right-of-way). Figure 2-25 is an example of two typical section concepts (work-in-progress drafts) that illustrate primary vertical elements associated with the HSR guideway and wayside settings.

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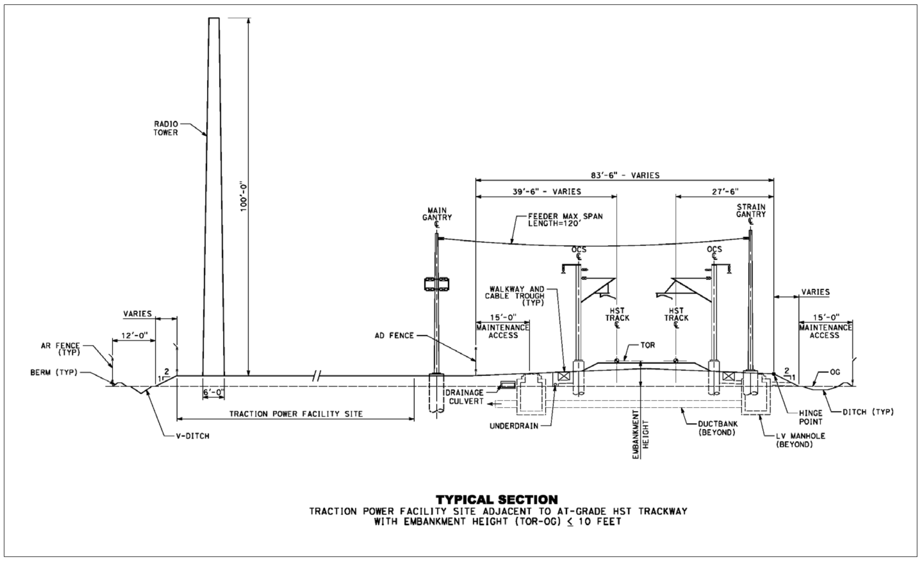
[22] See Authority website, www.hsr.ca.gov/docs/programs/green_practices/sustainability/Urban%20Design%20Guidelines.pdf
[23] See Authority website, www.hsr.ca.gov/docs/programs/eir_memos/Proj_Guidelines_TM200_06R00.pdf



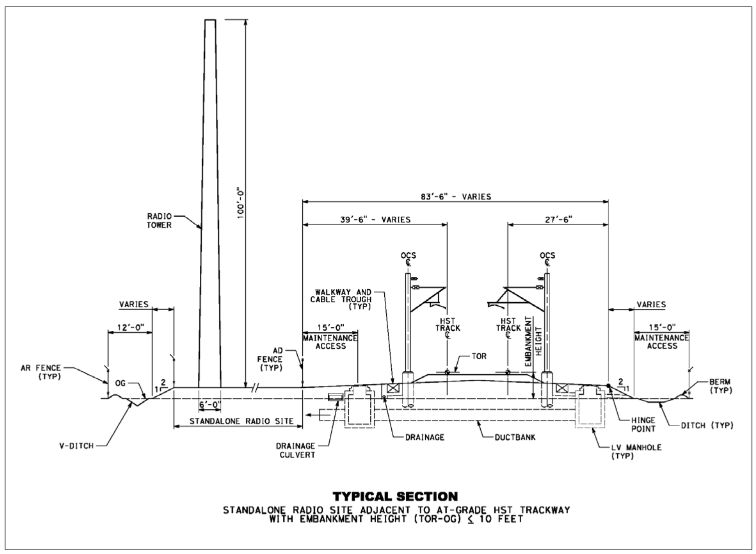


Figure 2-25 HSR Guideway At-grade with Communications Tower Co-located at Traction Power Substation or Standalone (examples only)

The following technical memoranda provide detailed information for developing typical sections for use in EIR/EIS documents, subject to approval of the Authority:

- TM 0.1 *15% Design Scope Guidelines*[24]
- TM 1.1.21 *Typical Cross Sections for 15% Design*[25]
- TM 2.1.7 *Rolling Stock and Vehicle Intrusion Protection for High-Speed Rail and Adjacent Transportation Systems*[26]

[24] See Authority website, www.hsr.ca.gov/docs/programs/eir_memos/TM_0_1_15_Design_Scope_R3_131224_no_sigs.pdf
[25] See Authority website, www.hsr.ca.gov/docs/programs/eir_memos/Proj_PB_PMT_03650_Release_TM1_1_21R01.pdf
[26] See Authority website, www.hsr.ca.gov/docs/programs/eir_memos/TM%202.1.7%20Intrusion%20Protection%20R1%20130610%20no%20sigs.pdf

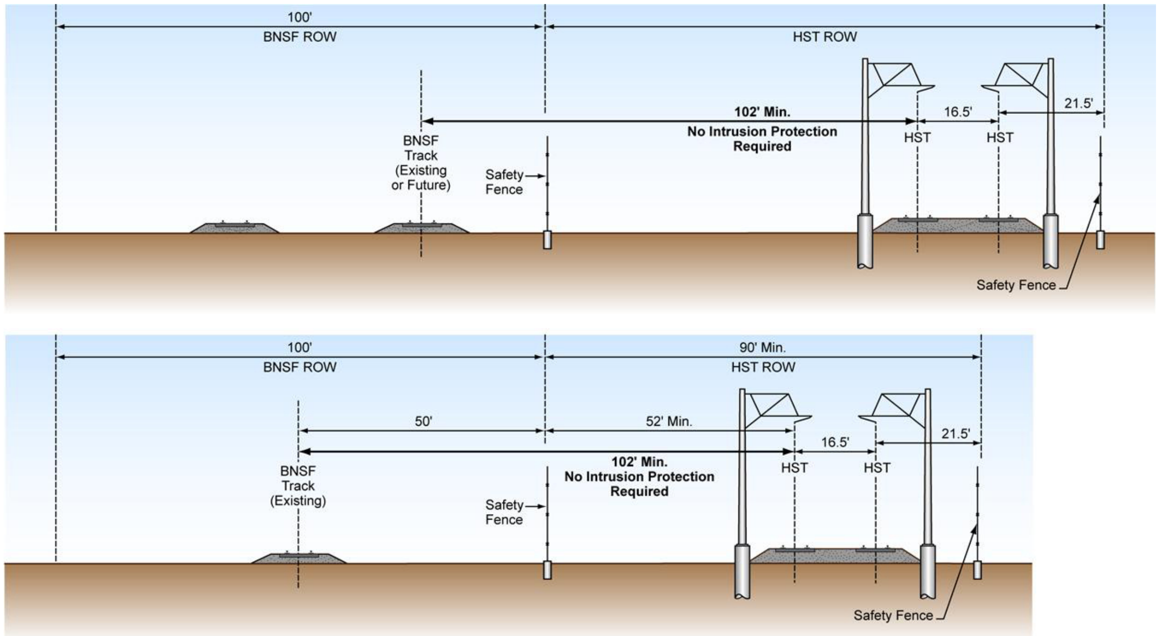
- TM 2.8.1 *Safety and Security Design Requirements for Infrastructure Elements*[27]
- TM 3.4.2 *Communications Systems Site Requirements*[28]

2.5.3.1 Rationale

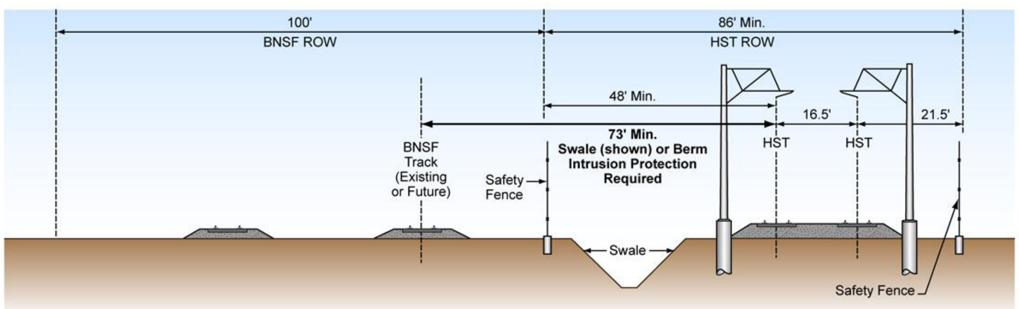
Begin the description of each HSR build alternative by discussing the central theme, project purpose, need, or objective, or formative rationale represented by the alternative (e.g., HSR alignment within existing transportation corridors, avoidance or minimization of environmental or community impacts). Use graphics to illustrate the underlying concepts or application of the rationale. The *Fresno to Bakersfield Section Final EIR/EIS* provides an example of this discussion and supportive illustrations.

> *An important objective of the project is to align HSR tracks adjacent to existing transportation corridors. The BNSF Alternative is designed to follow the existing BNSF Railway corridor adjacent to the BNSF mainline right-of-way as closely as practicable. Minor deviations from the BNSF Railway route are necessary to accommodate design requirements; namely, wider curves are necessary to accommodate the speed of the HSR compared to the existing lower-speed freight line track alignment. The BNSF Alternative would not follow the BNSF Railway right-of-way between approximately East Conejo Avenue in Fresno County and Nevada Avenue in Kings County. Instead, the alignment would curve to the east on the north side of the Kings River and away from the city of Hanford, and would rejoin the BNSF Railway near the City of Corcoran.*
>
> *The BNSF Alternative's cross sections include provisions for a 102-foot separation of the HSR track centerline from the BNSF Railway track centerline, as well as separations that include swale or berm protection, or an intrusion protection barrier (wall) where the HSR tracks are closer. Figure 2-26 shows cross sections of these various configurations where there would not be a shared right-of-way with BNSF. Figure 2-27 shows the same cross sections illustrating a shared right-of-way with BNSF; the design guidelines recognize BNSF as a potential shared corridor partner, which in some locations could reduce the horizontal separation of the HSR from the BNSF Railway facility by as much as 25 feet, assuming the appropriate intrusion protection barrier is provided.*
>
> *For purposes of the EIR/EIS, it is assumed no encroachment on the BNSF right-of-way would occur. A 102-foot separation between the centerlines of BNSF Railway and HSR tracks is provided wherever feasible and appropriate. In urban areas where a 102-foot separation could result in substantial displacement of businesses, homes, and infrastructure, the separation between the BNSF Railway and the HSR was reduced. The areas with reduced separation require protection to prevent encroachment on the HSR right-of-way, in the event of a freight rail derailment. Protection would consist of a swale, berm, or wall, depending on the separation.*

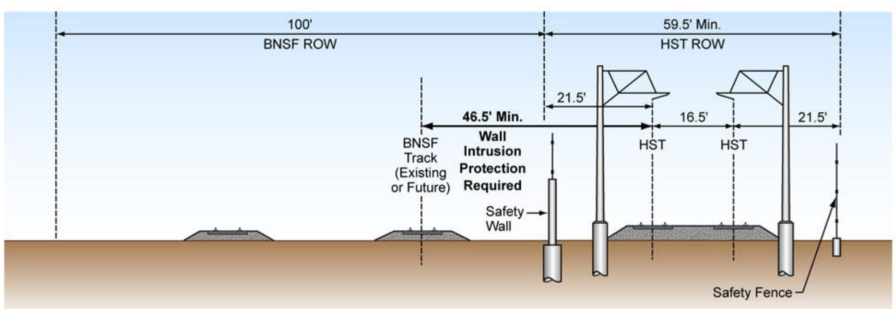
[27] See Authority website, www.hsr.ca.gov/docs/programs/eir_memos/TM%202.8.1%20Safety%20and%20Security%20Design%20Requirements%20R0%20120312no%20sigs.pdf
[28] See Authority website, www.hsr.ca.gov/docs/programs/eir_memos/Proj_Guidelines_TM3_4_2R00.pdf



(a) BNSF Centerline Track-to-Track Separation 102 Feet or More
(No Intrusion Protection Required)

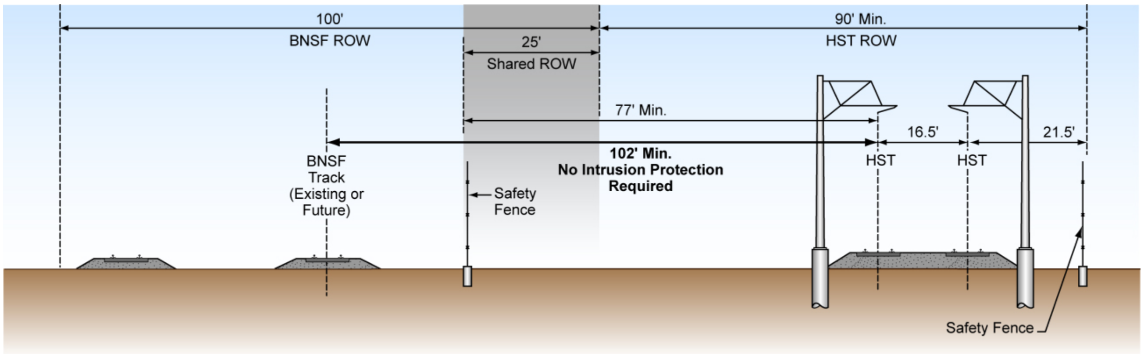


(b) BNSF Centerline Track-to-Track Separation 73 Feet to 102 Feet
(Swale or Berm Intrusion Protection Required)

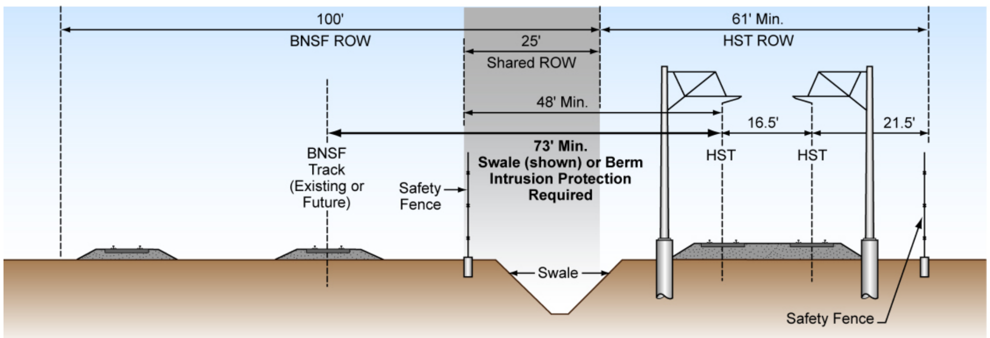


(c) BNSF Centerline Track-to-Track Separation 46.5 Feet (Min.) to 73 Feet
(Wall Intrusion Protection Required)

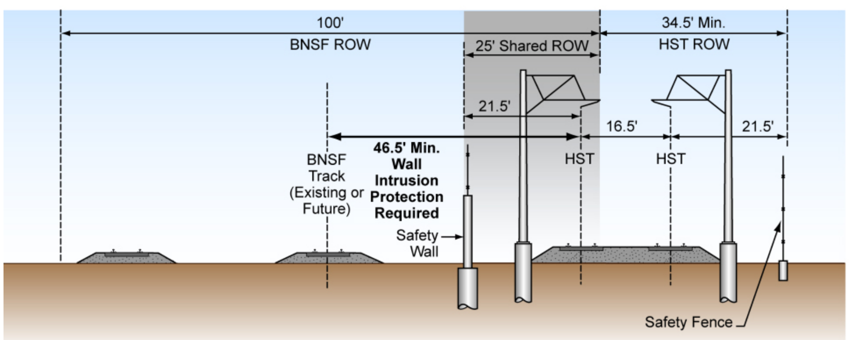
Figure 2-26 BNSF Alternative without shared right-of-way (example only)



(a) BNSF Centerline Track-to-Track Separation 102 Feet or More
(No Intrusion Protection Required)



(b) BNSF Centerline Track-to-Track Separation 73 Feet to 100 Feet
(Swale or Berm Intrusion Protection Required)



(c) BNSF Centerline Track-to-Track Separation 46.5 Feet (Min.) 73 Feet
(Wall Intrusion Protection Required)

Figure 2-27 BNSF Alternative showing opportunity for shared right-of-way (example only)

2.5.3.2 Alternative Description

Describe in detail each HSR build alternative from end-to-end, organized by geographic segment in the direction of the HSR section title (e.g., from San Francisco to San Jose, from Los Angeles to Anaheim). Though the presentation by geographic segment will be the primary organizing structure of affected environment, impacts, and mitigation measures in Chapter 3 of the EIR/EIS, the segments are the secondary organizing structure when presenting the alternatives that are evaluated in the EIR/EIS. Provide an overview map that clearly shows all location details that are used in the text to describe extents or other physical locations of alternatives. Use additional maps where necessary to illustrate detail. Refer to Volume 2, Appendices 2-A and 2-B, for additional detailed information on road and railroad crossings (respectively). Extensive use of

illustrative maps and other graphics is strongly encouraged to assist readability and comprehensibility of technical information for a broad range of audience abilities.

Proceeding in linear sequence through each segment, describe and illustrate the following (as appropriate for the HSR section and discrete alternative).

Alignment and Ancillary Features

Describe the type, location, and extents of rail alignment and ancillary features of each build alternative, such as:

- HSR track infrastructure (e.g., track profile at, below, or above-grade; elevated structures or extents; bridges, straddle bents, tunnels; structure heights or profile depths; intrusion and other barrier locations)
- Operational facilities (e.g., TPSS, switching stations, paralleling stations, communications towers, power transmission lines)[29]
- Irrigation and drainage facilities
- Wildlife crossing structures (include figures illustrating wildlife crossing elevation and cross section and wildlife crossing drainage detail)

Show locations of HSR alignment and ancillary features in the map(s) of the alternative. Use additional maps or other graphics where necessary to illustrate parcel-level detail of physical changes and property ownership locations. The *Fresno to Bakersfield Section Final EIR/EIS* provides an example of this discussion, organized by segment.

> *This section describes the BNSF Alternative as it traverses from north to south from Fresno to Bakersfield. Appendix 2-A of this EIR/EIS provides additional detailed information of HSR roadway crossings within these vicinities.*
>
> ***Fresno County***
>
> *The BNSF Alternative would begin at the north end of the Fresno Station tracks adjacent to the western side of the UPRR right-of-way in the vicinity of Amador Street. The alignment would be at-grade as it crosses the currently inactive Fresno Bee railroad spur, rendering it unusable. The alignment would continue at-grade southeast through Fresno on the western side of the UPRR until reaching East Jensen Avenue. An intrusion protection barrier approximately 1 mile long would be required from approximately Stanislaus Street to Ventura Avenue because of the proximity of the UPRR and HSR rights-of-way. The alignment would again be below-grade in a shallow trench as it travels underneath East Jensen Avenue and would then curve to the south and be elevated over Golden State Boulevard and SR 99. The elevated structure would span just over 1 mile and would reach a maximum height of approximately 55 feet to the top of the rail. The alignment would return to grade and join the BNSF Railway corridor on its western side at East Malaga Avenue south of Fresno.*
>
> *The BNSF Alternative would continue through Fresno County along the BNSF Railway right-of-way in an area consisting mostly of agricultural land. Approximately 24 miles of track would be in Fresno County. Nearly all of the alignment, roughly 20 of the 24 miles, would be at-grade. Approximately 5.5 miles of BNSF*

[29] Coordinate development of descriptions of traction power facilities, electrical power connections, and transmission lines with PMT and RC systems design groups. Describe facilities in sufficient detail to evaluate environmental and community impacts. If sufficient information is not available, disclose reasonable assumptions of HSR electrical power requirements to determine locations for power system connections, changes, or upgrades for HSR, and to assess likely impacts of typical facility siting and development.

Railway tracks would be realigned from approximately East Sumner Avenue to East Huntsman Avenue and from approximately East Rose Avenue to East Kamm Avenue, to accommodate the HSR alignment. The alignment would be elevated where it crosses from the western side to the eastern side of the BNSF Railway tracks near East Conejo Avenue. The elevated structure would span approximately 1 mile and would reach a maximum height of approximately 42 feet to the top of the rail as it crosses over the BNSF Railway tracks. The BNSF Railway siding tracks would be reconstructed on the opposite side of the mainline tracks in the vicinity of South Peach Avenue. The HSR alignment would be elevated over Cole Slough and the Kings River into Kings County. This elevated structure would clear the Cole Slough and Kings River levees by approximately 18 feet.

A TPSS site and PG&E switching station would be located along the BNSF Alternative south of Bowles in Fresno County, approximately 0.7 mile south of East Manning Avenue. This new 230 kV PG&E switching station would loop into the existing PG&E Gates—McCall 230 kV transmission lines. New equipment would be installed at the new PG&E switching station location to allow for interconnection of the existing power line to the traction power system.

Kings County

Approximately 28 miles of the BNSF Alternative would be in Kings County. The alternative would pass east of the city of Hanford, parallel to and approximately 0.5 mile east of SR 43 (Avenue 8). South of Hanford in the vicinity of Idaho Avenue, the BNSF Alternative would curve to the west and then south toward the BNSF Railway right-of way. The alignment was refined in this area to avoid special aquatic features north of Corcoran and east of the BNSF Railway. The alignment would rejoin the BNSF Railway right-of-way on its western side just north of Corcoran and travel through the eastern edge of the City of Corcoran. The majority of this part of the alignment would pass through agricultural land except where it travels through Corcoran. The alignment in Corcoran encompasses a number of land uses, including residential, commercial, and industrial. Approximately 10 miles of track within Kings County would be elevated. In addition to the elevated structure that would travel over the Kings River complex, the alignment would be on elevated structure to the east of Hanford. The structure would span a length of 2.5 miles, beginning just south of Fargo Avenue and ending just north of Hanford-Armona Road. This portion of the alignment would pass over the San Joaquin Valley Railroad and SR 198. The structure would reach a height of approximately 50 feet to the top of the rail. The Kings/Tulare Regional Station–East Alternative would be located along this structure near the SR 43 and SR 198 interchange.

The alignment would continue at-grade south of Hanford-Armona Road for approximately 10 miles, where it would again ascend onto an elevated structure over Cross Creek and the BNSF Railway right-of-way. The structure would span a length of approximately 3 miles, beginning just before Cross Creek and returning to grade just before Nevada Avenue. The elevated structure would reach a maximum height of 40 feet to the top of the rail. The alignment would then continue at-grade and require an intrusion protection barrier from approximately Nevada Avenue to approximately North Avenue. The barrier would be approximately 2 miles long. At Patterson Avenue, the alignment would again ascend onto an elevated structure over Brokaw Avenue, Whitley Avenue, a BNSF Railway spur, and agricultural facilities located at the southern end of the city of Corcoran. The structure would span approximately 2 miles. The alignment would be constructed on a retained embankment as it crosses into Tulare County.

Approximately 0.3 mile of BNSF Railway tracks would be realigned at Oregon Avenue, south of Corcoran.

Dedicated wildlife crossing structures would be provided from approximately Cross Creek south to the Tulare County line in at-grade portions of the railroad embankment at intervals of approximately 0.3 mile. Additionally, the BNSF Alternative would include dedicated wildlife crossing structures placed between 100 and 500 feet to the north and south of each of the following river/creek crossings: St. Johns Cut (Dutch Slough), Kings River, and Cross Creek.

A TPSS site and PG&E switching station would be located along the BNSF Alternative to the southeast of Hanford in Kings County, approximately 0.5 mile east of SR 43 on Jackson Avenue. Two pairs of TPSS and 115 kV PG&E switching station options are being considered, one set north of Jackson Avenue and the other set south of Jackson Avenue. The chosen PG&E switching station would loop into the existing PG&E Kingsburg—Corcoran 115 kV transmission lines. New equipment would be installed at the new PG&E switching station location to allow for interconnection of the existing power line to the traction power system.

Tulare County

The BNSF Alternative crosses approximately 22 miles of Tulare County. The alignment travels through the county adjacent to the western side of the BNSF Railway right-of-way. The majority of the alignment would be at-grade, with only a combined total of 4 miles elevated where the alignment crosses the Tule River and then both Deer Creek and the Stoil railroad spur from the BNSF Railway. The elevated structure would reach a height of approximately 50 feet to the top of the rail. This alignment would cross over Lakeland Canal.

Dedicated wildlife crossing structures would be provided throughout at-grade portions of the railroad embankment at intervals of approximately 0.3 mile. Additionally, the BNSF Alternative would include dedicated wildlife crossing structures placed between 100 and 500 feet to the north and south of each of the following river/creek crossings: Tule River and Deer Creek.

A TPSS site and PG&E switching station would be located along the BNSF Alternative north of Alpaugh in Tulare County, near the intersection of SR 43 and Avenue 96. An existing PG&E substation is located at this intersection, which would be upgraded and expanded to accommodate HSR interconnection. Two pairs of TPSS and 115 kV PG&E switching station options are being considered, one set adjacent to the existing PG&E substation and the other set approximately 0.3 mile south of the existing PG&E substation. New equipment would be installed at the new PG&E switching station location to allow for interconnection of the existing power line to the traction power system.

Kern County

The Kern County segment of the BNSF Alternative is approximately 43 miles long and would pass through the cities of Wasco and Shafter on its way to Bakersfield. It would closely follow the western side of the BNSF Railway corridor until just south of Wasco, where it would cross over to the eastern side of the BNSF Railway tracks. Approximately 4 miles of BNSF Railway tracks would be realigned in the vicinity of Fourth Street, from Eighth Street to Poso Avenue, and from Jackson Avenue to Merced Avenue to accommodate the HSR alignment. The alignment would continue on the eastern side of the BNSF Railway right-of-way through Shafter and then cross over once more to the western side of the BNSF Railway right-of-way. Approximately 8 miles of Santa Fe Way would be shifted to

the west of the proposed HSR alignment to accommodate the HSR right-of-way, from north of Riverside Street to south of Renfro Road. Approximately 1.5 miles of the BNSF's Lone Star rail spur would be realigned from Riverside Street to south of Burbank Street. The alignment would generally follow the BNSF Railway corridor through Bakersfield to the project terminus in the vicinity of Baker Street. Approximately 2.5 miles of BNSF Railway tracks would be realigned in Bakersfield from Jomani Drive to Glenn Street and from Oak Street to C Street to accommodate the HSR alignment. Within this portion of the alignment, approximately 25 miles would be at-grade, while the remainder of the alignment would be elevated. There would be four elevated sections along this segment of the BNSF Alternative. The alignment would be elevated over Poso Creek, as well as in the cities of Wasco, Shafter, and Bakersfield.

The first is a shorter span of elevated structure, extending just over 300 feet across Poso Creek. The second elevated section would cross over SR 46, pass through Wasco for a distance of about 3 miles and return to grade in the vicinity of Kimberlina Road. It would average 35 feet in height to the top of the rail. From approximately Kimberlina Road, the alignment would continue at-grade for approximately 5 miles to just north of Shafter Avenue where it would again ascend onto an elevated structure.

The alignment would be on an elevated structure through Shafter for a distance of about 4 miles between North Shafter Avenue and Cherry Avenue. This structure would pass over a BNSF Railway yard within the city, and reach a maximum height of approximately 45 feet to the top of the rail. After returning to grade just south of Cherry Avenue, the alignment would travel approximately 10 miles to Country Breeze Place where it would ascend onto another elevated structure through Bakersfield.

From Country Breeze Place through the Bakersfield Station to Oswell Street, the BNSF Alternative would be on an elevated structure. The elevated structure through Bakersfield would pass over the Westside Parkway, SR 99, and a BNSF Railway yard. It would range in height from 50 to 90 feet to the top of the rail. The highest elevations in the City of Bakersfield would be reached between Rosedale Highway and SR 99. From SR 99 to the terminus of the BNSF Alternative, the structure would range in height from 50 to 70 feet to the top of the rail. In Bakersfield, the alignment would displace four religious facilities, the Bakersfield High School Industrial Arts building, the Mercado Latino Tianguis, the CityPlace apartment complex and 123 homes in the eastern portion of the city. For more detail, see Section 3.12, Socioeconomics, Communities, and Environmental Justice.

Dedicated wildlife crossing structures would be provided in at-grade portions of the railroad embankment at intervals of approximately 0.3 mile. The BNSF Alternative would also include dedicated wildlife crossing structures placed between 100 and 500 feet to the north and south of the Poso Creek crossing. Dedicated wildlife crossing structures would not be required to the north and south of the Kern River as the BNSF Alternative would be elevated.

A TPSS site and PG&E switching station would be located along the BNSF Alternative through Wasco and Shafter on the northeastern edge of Wasco in Kern County, near the intersection of SR 43 and Gromer Avenue. This HSR interconnection location would connect directly to the existing PG&E Charca Substation, which is located approximately 0.3 mile east of the SR 43 and Gromer Avenue intersection. The Charca Substation would be reconfigured to provide the new 115 kV connections. Two pairs of TPSS and 115 kV PG&E

switching station options are being considered, one set approximately 0.3 mile north of the intersection of SR 43 and Gromer Avenue and the other set approximately 0.4 mile south of the intersection of SR 43 and Gromer Avenue. A new transmission line approximately 0.8 mile long would be built to connect this interconnection location with the existing Charca Substation. New equipment would be installed at the new PG&E switching station location to allow for interconnection of the existing power line to the traction power system.

Another TPSS site and PG&E switching station would be located along the BNSF Alternative in Bakersfield in the area where the BNSF Railway tracks cross Truxtun Avenue and Gates Canal in Kern County. Two pairs of TPSS and 115 kV PG&E switching station options are being considered, one set north of the HSR alignment and the other set south of the HSR alignment. The chosen PG&E switching station would loop into the existing PG&E Kern—Westpark 115 kV transmission lines. New equipment would be installed at the new PG&E switching station location to allow for interconnection of the existing power line to the traction power system.

Station Site(s)

For each station alternative, describe the station site location and setting (e.g., surrounding land uses, nearby landmarks, historic resources or other significant community features directly affected by the station and related facilities, and community context). Describe the general facility design parameters, including site size, facility configuration (e.g., architectural and site design concepts, station buildings and functions, dimensions and massing, amenities, entrance locations, platform access), site access and egress (including entry and exit orientations). Describe the modal integration and function of the station site and vicinity (e.g., parking structures, kiss-and-rides, bus bays, or connections with other transit modes). Where relevant, describe features for blended system/operations. Provide graphic illustrations of architectural and site plan concepts, and visual simulations. Show locations of HSR station(s) in the map of the alternative. The *Fresno to Bakersfield Section Final EIR/EIS* provides an example of the HSR station discussion, presented by alternative.

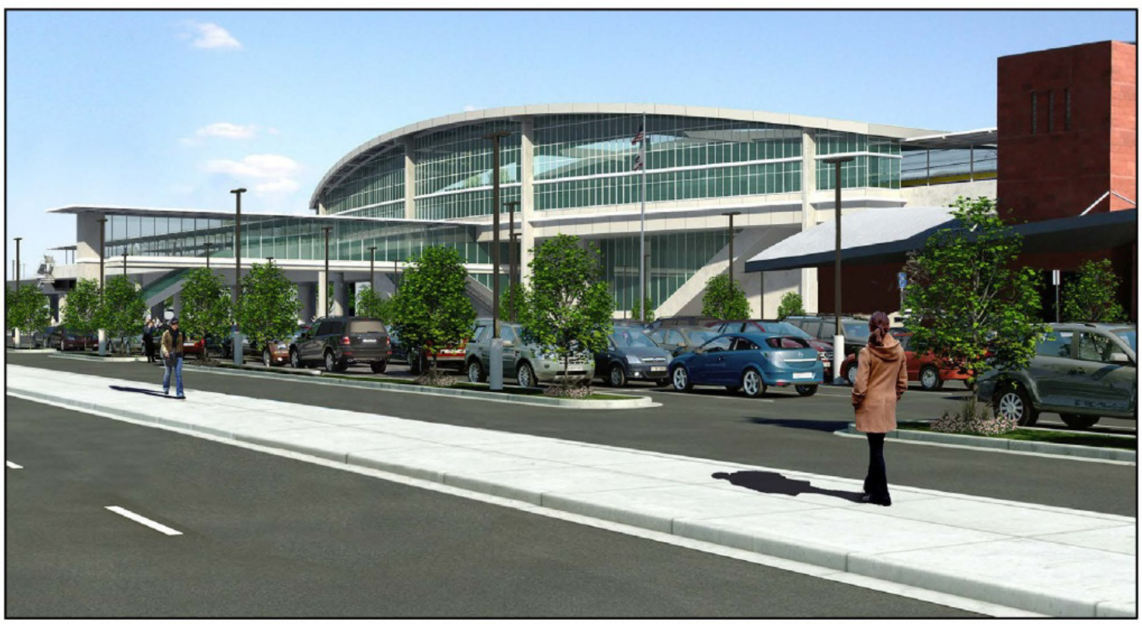
Three alternative sites are under consideration for the Bakersfield Station. Figure 2-28 depicts the conceptual station plans for the "functional" and "iconic" architectural design options for the Bakersfield station structure. As in Fresno, the ultimate appearance of the station would be determined in collaboration with key community representatives and include stakeholder input.

Bakersfield Station–North Alternative

The Bakersfield Station–North Alternative would be located at the corner of Truxtun and Union Avenue/SR 204 on the BNSF Alternative. Surrounding land uses in the area consist of offices, commercial, retail, industrial, and government offices. The Amtrak station is west of the proposed station site. A conceptual site plan for this station alternative is provided in Figure 2-29.

Access to the site would be from Truxtun Avenue, Union Avenue, and S Street. Two new boulevards would be built from Union Avenue and S Street to access the station and the supporting facilities. The main entrance would be located on the northern end of the site. The three-level station building would be 52,000 square feet, with a maximum height of approximately 95 feet. The first level would house station operation offices and would also accommodate other trains running along the BNSF Railway line. The second level would include the mezzanine; the platforms and guideway would pass through the third level.

a. Conceptual Station Design (Functional Design Treatment)



b. Conceptual Station Design (Iconic Design Treatment)

Source: William Kanemoto & Associates, 2011; VBN Architects, 2011; Newlands and Company, 2011

Figure 2-28 Bakersfield Station Conceptual Designs *(example only)*

Figure 2-29 Bakersfield Station–North Alternative (example only)

The entire site would consist of 19 acres, with 11.5 acres designated for the station, bus transit center, short-term parking, and kiss-and-ride areas. An additional 7.5 acres would house two parking structures, one with a planned capacity of approximately 1,500 cars, and the other with a capacity of approximately 3,000 cars. In addition, another 175 spaces would be provided in surface lots. The balance of the supply necessary to accommodate the full 2035 parking demand (8,100 total spaces) would be provided through use of underutilized facilities around the station and in Downtown Bakersfield. Identification of these additional spaces would be coordinated with the City of Bakersfield as a part of a comprehensive parking strategy. Additional environmental review may be necessary as parking needs are identified for full system operations. Under this alternative, the station building would be located at the western end of the parcel footprint. The bus transit center and the smaller of the two parking structures (2.5 acres) would be north of the HSR tracks. The BNSF Railway track runs through the station site. The HSR tracks would be above the BNSF Railway tracks.

Bakersfield Station–South Alternative

The Bakersfield Station–South Alternative would be in the same area as the North Station Alternative, but would be situated along Union and California

avenues on the Bakersfield South Alternative, just south of the BNSF Railway right-of-way (Figure 2-30). The two-level station building would be approximately 51,000 square feet, with a maximum height of approximately 95 feet. The first floor would house the concourse, and the platforms and guideway would be on the second floor.

The entire site would be 20 acres, with 15 acres designated for the station, bus transit center, short-term parking, and kiss-and-ride areas. Five of the 20 acres would support one six-level parking structure with a capacity of approximately 4,500 cars. In addition, another 500 spaces would be provided in surface lots. As with the Bakersfield Station–North Alternative, the balance of the supply necessary to accommodate the full 2035 parking demand (8,100 total spaces) would be identified as a part of a comprehensive parking strategy in coordination with the City of Bakersfield, and may require additional environmental review. Access to the station site would be from two new boulevards: one branching off from California Avenue, and the other from Union Avenue.

Bakersfield Station–Hybrid Alternative

The Bakersfield Station–Hybrid Alternative would be in the same area as the North and South Station alternatives, and would be located at the corner of Truxtun and Union Avenue/SR 204 on the Bakersfield Hybrid Alternative (Figure 2-31). The station design includes an approximately 57,000-square-foot main station building and an approximately 5,500-square-foot entry concourse located north of the BNSF Railway right-of-way. The station building would have two levels with a maximum height of approximately 95 feet. The first floor would house the concourse, and the platforms and guideway would be on the second floor. Additionally, a pedestrian overcrossing would connect the main station building to the north entry concourse across the BNSF right-of-way.

The entire site would be approximately 24 acres, with 15 acres designated for the station, bus transit center, short-term parking, and kiss-and-ride areas. Approximately 4.5 of the 24 acres would support 3 parking structures with a total capacity of approximately 4,500 cars. Each parking structure would be 7 levels; one with a planned capacity of 1,750 cars, another with a capacity of 1,315 cars, and the third with a planned capacity of 1,435 cars. An additional 460 parking spaces would be provided in surface lots covering a total of approximately 4.5 acres of the station site. As with the Bakersfield Station–North and Bakersfield Station–South alternatives, the balance of the supply needed to accommodate the full 2035 parking demand (8,100 total spaces) would be identified as a part of a comprehensive parking strategy developed in coordination with the City of Bakersfield. Access to the station site would be from Truxtun Avenue and Union Avenue as well as Hayden Court. Under this alternative, the BNSF Railway track would run through the station site, and the main station building and majority of the station facilities would be sited south of the BNSF Railway right-of-way.

Maintenance Facility Site(s)

For each HMF alternative and TSMF alternative (as applicable to the HSR section), describe location and property setting (e.g., surrounding land uses, major landmarks, historic resources, or other significant community features directly affected by maintenance facilities), site size(s), access track entry to and exit from the site, proposed changes in roadways to accommodate access track, and other characteristics that distinguish the alternative maintenance facility sites. Describe potential land use considerations in the vicinity of the TSMF site. Provide a vicinity map for each site at sufficient scale to illustrate the access track and roadways that could be affected

by a maintenance facility at the proposed location. The *Fresno to Bakersfield Section Final EIR/EIS* provides an example of the maintenance facility discussion.

Fresno Works–Fresno HMF Site

If the Fresno Works–Fresno site (Figure 2-32) is selected for the HMF, the configuration of HSR access tracks would be based on facility layout. The site is located within the southern limits of the city of Fresno next to the BNSF Railway right-of-way between SR 99 and Adams Avenue. HSR access tracks would extend from both the northern and southern ends of the site and, depending on site configuration, overcrossings may be required to clear the BNSF Railway. Proposed roadway modifications include overcrossings and closures. Access tracks are not expected to add to the number of roadway crossings or shifts proposed by the project.

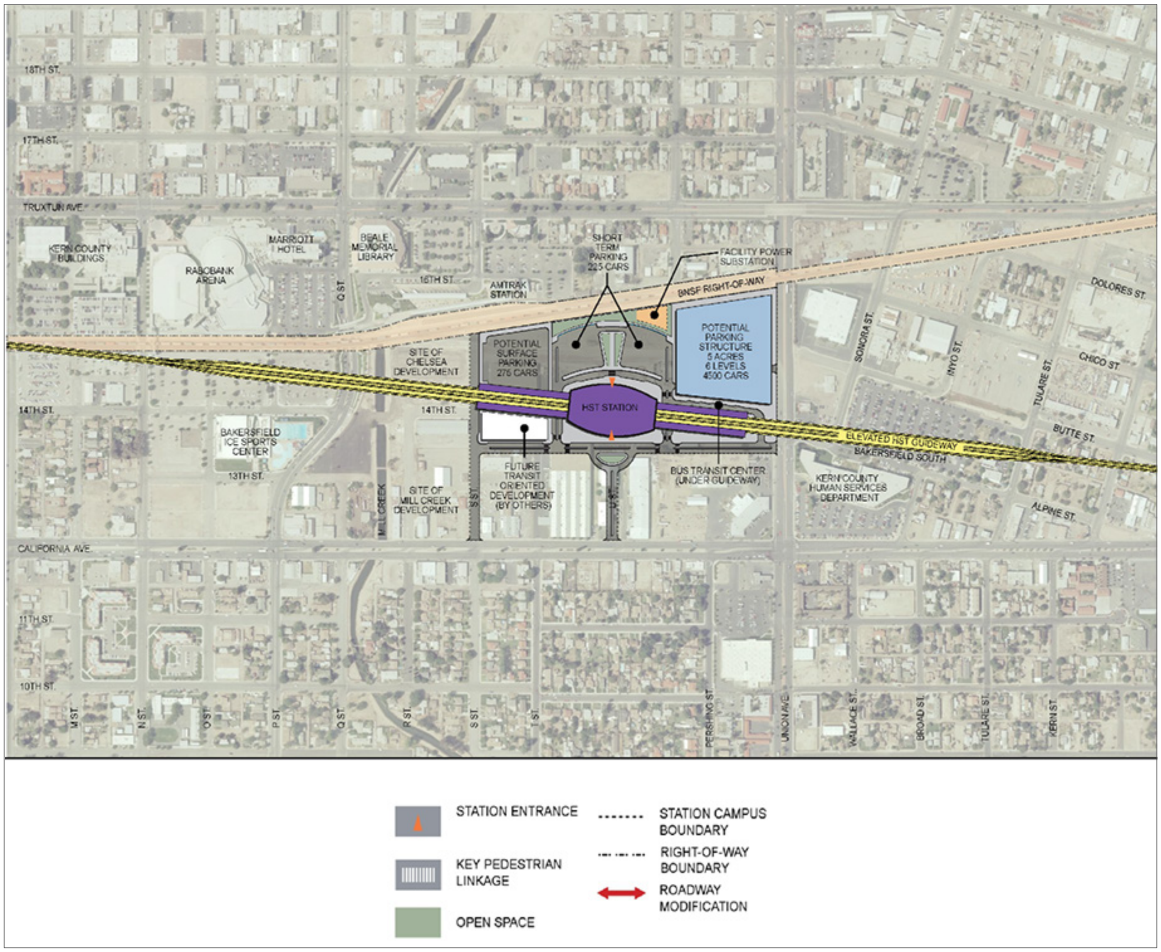


Figure 2-30 Bakersfield Station-South Alternative (example only)

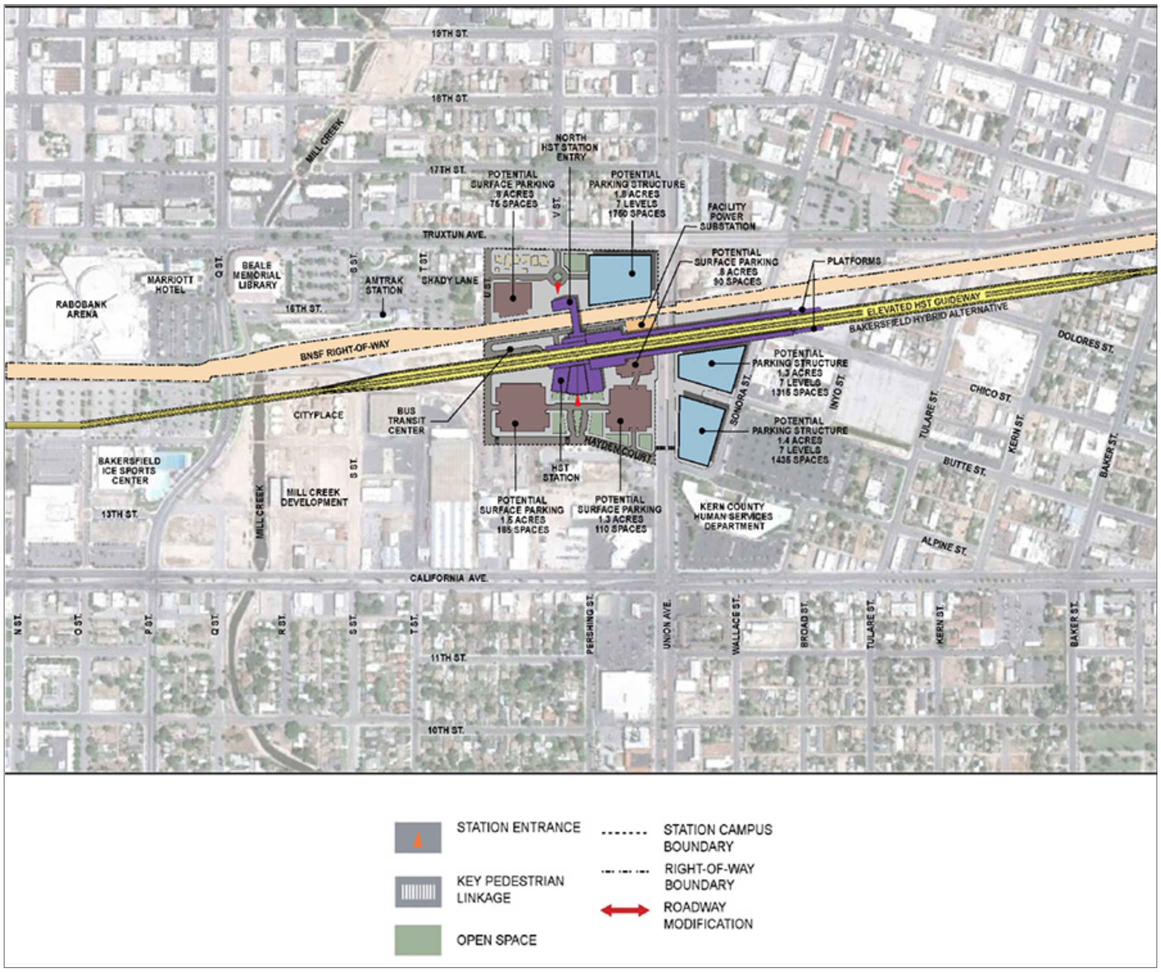


Figure 2-31 Bakersfield Station–Hybrid Alternative (example only)

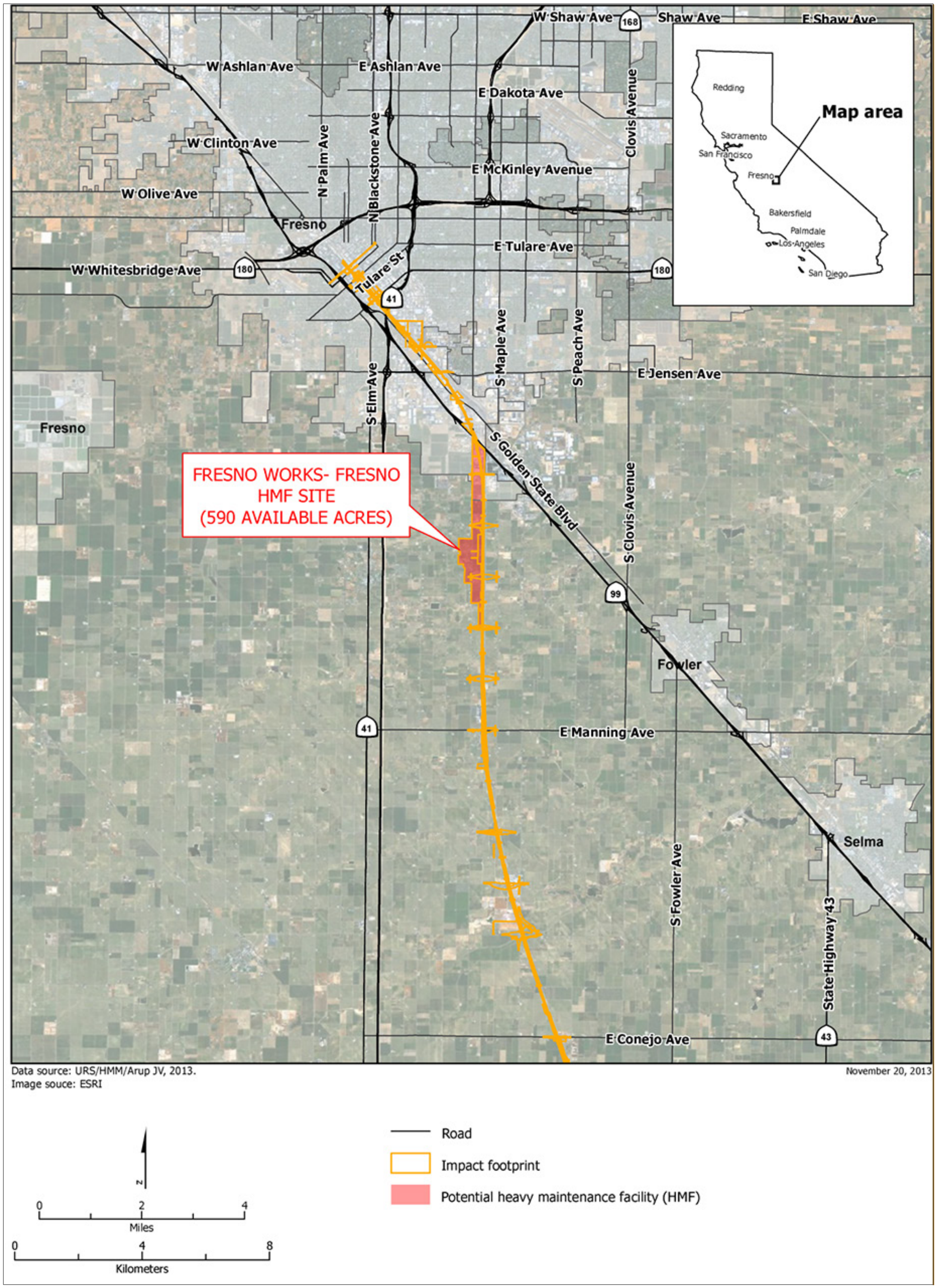


Figure 2-32 Potential Fresno Works–Fresno HMF Site (example only)

State Highway or Local Roadway Modifications

These are types, locations and extents of vertical and horizontal encroachments or displacements and likely lane reconfigurations, or permanent closures or construction detours of state highway or route underpasses, overcrossings, intersection legs or ramps, and local roadways. Show locations of roadway modifications in the map of the alternative. The *Fresno to Bakersfield Section Final EIR/EIS* provides an example of state route reconfigurations.

State Route 46

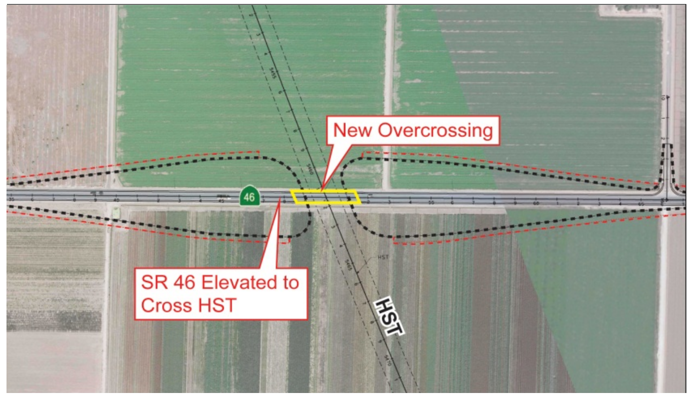


Figure 2-33 State Route 46 reconfiguration (example only)

To the east of Wasco, the Wasco-Shafter Bypass Alternative would be at-grade and intersect with SR 46. In order to separate the HSR and the state facility, SR 46 would remain on its current horizontal alignment but would be reconfigured vertically to cross over the HSR (Figure 2-33). The proposed reconstruction of SR 46 includes two 12-foot lanes, two 8-foot shoulders, and two 5-foot sidewalks. The traffic from SR 46 would be detoured onto local roads during construction.

Freight or Passenger Railroad Modifications

These are types, locations, and extents of vertical and horizontal encroachments or displacements and likely reconfigurations, or permanent closures or construction detours of existing freight or passenger railroad tracks, stations, yards, roadway grade crossings, underpasses, overcrossings, or other facilities. Show locations of railroad modifications in the map of the alternative. The *Fresno to Bakersfield Section Final EIR/EIS* presents this information as part of the description of Alignment and Ancillary Features. In future EIR/EIS documents, present freight or passenger railroad modifications in a topic-specific subsection to clearly present detailed information and convey sufficient contextual emphasis for the information.

Land Use and Community Modifications

These are type(s), location(s), and extent(s) of adjacent existing and planned land uses, and of structure/facility displacements. Refer to the Socioeconomics and Communities, and Environmental Justice sections for additional detail. Include information for cities and counties along the alignment. Show locations of local communities and jurisdictions in the map of the alternative. See the *HSR Alignment and Ancillary Features* example from the *Fresno to Bakersfield Section Final EIR/EIS* for an example of this discussion. In future EIR/EIS documents, this information may be presented in a topic-specific subsection to clearly describe detail and convey sufficient contextual emphasis.

2.6 Travel Demand and Ridership Forecasts

Describe the ridership forecast methodology used for planning the HSR system and the EIR/EIS analyses. Refer to the *Environmental Guidance to HSR Regional Teams EIS/EIR Revised Authority Program Implementation and Ridership Assumptions, and Project Lexicon* (June 2014) for guidance on baseline years, HSR system configuration and phasing, and definitions of common terminology. Summarize modeling variables, such as forecast year, number of zones, Service Plan assumptions, system phasing, probability-based ridership forecasts and ramp-up, and parking

costs. Since ridership assumptions and forecasts are updated by the Authority with each biennial Business Plan Update, coordinate with the Authority and PMT to obtain up-to-date information for this discussion. Cite the most recent ridership and regional induced growth modeling by Cambridge Systematics (e.g., *California High-Speed Rail Ridership and Revenue Model: Development, Application, and Project-Level Forecasts*), the most recent version of the Authority Technical Memorandum *Station Boarding, Access, Egress, and Parking Guidance* (initial draft in progress), and Volume 2 Appendix 2-C *Operations and the Service Plan Summary*.

Use a table to summarize HSR system "medium" and "high" ridership forecasts (i.e., 50th percentile confidence for medium forecasts and 75th percentile confidence for high forecasts)) for the appropriate milestone years of system build stages (for the 2014 Business Plan, these are 2022 for the IOS, 2027 for Bay to Basin, 2029 for Phase 1, and 2040 for Phase 1 full utilization), derived from the most recently adopted Authority Business Plan, Cambridge Systematics model, and associated Authority/PMT guidance. Explain the various influences of ridership forecasting on:

- HSR System Design, where ridership forecasts influence certain aspects of HSR design, but do not influence HSR system elements, such as trackwork, power distribution, train control/signal system, rolling stock, platform design, and maintenance facility locations
- Environmental Impact Analysis, where "medium" ridership forecasts are a factor in conservative analyses of benefits to traffic, air quality, noise and energy; and "high" ridership forecasts are a basis of the "worst-case" approach to evaluating environmental and community impacts
- Station Area Parking, where ridership forecasts are a primary factor in determining parking demand and influence implementation of Authority policies related to land use and development in station areas.

2.6.1 Ridership and HSR System Design

The following excerpt from the *Fresno to Bakersfield Section Final EIR/EIS* can be tailored for this discussion. Note that time-based and location-based content must be updated to reflect current information for the HSR section.

The HSR system is a long-term transportation investment for the state of California. Many components of the HSR system infrastructure have a design life of 30, 50, and even 100 years. The HSR system analyzed in this EIR/EIS is designed to provide adequate infrastructure and facilities for a state-of-the-art, high-speed passenger train system over many decades (Parsons Brinckerhoff 2010). While much infrastructure must be designed and built for full utility, certain components of the HSR system are more flexible and can change and adapt depending on how HSR ridership grows over time.

Total forecasted annual ridership on the HSR system is not the primary driver of HSR system design. While the Authority and FRA have weighed ridership and revenue potential in evaluating alignment and station alternatives in the Tier 1 Program EIR/EIS documents and Tier 2 alternatives screening, the design of most HSR system components is dictated by the agencies' performance objectives and safety requirements, rather than by total annual ridership. The [fully dedicated portion of the] HSR system will be a two-track system throughout, with four tracks at intermediate stations, regardless of total annual ridership. [Similarly, the track and station configurations in blended portions of the system will be based upon operational requirements of the rail operators] Track geometry and profile, power distribution systems, train control/signal systems, and the type of rolling stock will be the same whether the HSR system has 50 million riders annually or 100 million. Most station elements also will be the same regardless of total annual ridership, such as platform design and other necessary station components. The location of the HMF and the light maintenance facilities are dictated by technical operating requirements for the HSR system, not by ridership.

Ridership influences HSR system design in some respects. The size of the HMF and the light-maintenance facilities is based on the 2040 high-ridership forecast to ensure adequate sizing of these facilities to accommodate maximum future needs. This approach is consistent with general planning and design practice for a large infrastructure project, acquiring enough land for future needs up front rather than trying to purchase property at a later date when it may no longer be available or impractical to acquire. This would allow early phases of maintenance facility construction and later expansion as fleet size and maintenance requirements grow.

For stations, forecasted annual ridership and peak-period ridership play a role in determining the size of some station components, such as those required for public access and egress to the HSR system. The 2040 high-ridership forecast formed the basis for the conceptual service plan, which in turn influenced the station designs by ensuring the station facilities, would be sufficient to accommodate the anticipated future use of the HSR system, which is expected to build over time.

For station-area parking facilities, the 2040 high-ridership scenario was used to determine the maximum potential parking demand and to allow for an analysis of where and how parking demand might be accommodated. Parking facilities are expected to be phased in over time as demand grows. The EIR/EIS reliance on the high forecasts for parking provides flexibility over time to change or even reduce the amount of station parking as improved TOD occurs around station areas.

2.6.2 Ridership and Environmental Impact Analysis

The level of annual HSR ridership plays a role in the analysis of environmental impacts and benefits for traffic, air quality, noise, and energy. For these topics, this EIR/EIS uses the high ridership forecast for analyzing the potential for adverse environmental impacts of building and operating the HSR system. This "worst-case" approach ensures disclosure of the higher level of adverse environmental effects that may occur with higher ridership (e.g., pass-by train noise, station-area traffic). If eventual ridership is lower, adverse environmental impacts would also be lower. For environmental benefits from the HSR system (e.g., transportation, air quality, energy), a lower level of ridership would reduce the level of benefits provided by the HSR system. This is discussed in more detail in Chapter 3.

2.6.3 Ridership and Station Area Parking

HSR system ridership, parking demand, parking supply, and development around HSR stations are intertwined, and anticipated to evolve from commencement of revenue service in 2022 to full system operations in 2040. The Authority's goals are to support HSR ridership by promoting, in partnership with local agencies, TOD around HSR stations and expansion of multi-modal access to the HSR system including the expansion of local transit to bring riders to HSR stations, and the environmental clearance of, and land for, potential parking facilities. This is a delicate balance that will evolve over time and vary by station, as some cities and regions will develop their station areas and local transit systems more than others by 2022 and 2040.

Research suggests that the percentage of transit passengers arriving/departing transit stations by car and needing to park decreases as land use development and population around the stations increases. The Authority's adopted station area development policies recognize this inverse relationship between parking demand and HSR station area development. HSR will be most successful if stations are placed where there is or will be a high density of population, jobs, commercial activities, entertainment, and other activities that generate trips. The Authority's policies, therefore, encourage dense development around HSR stations, which supports system ridership while reducing parking demand.

Land use development around HSR stations will not occur immediately, however. While HSR will be a catalyst for such development, actual construction will be dictated by local land use decisions and market conditions. The Authority will encourage station area development in partnership with local government, as exemplified by the station area planning grants it has

provided to the City of Fresno and offered to the City of Bakersfield, but the Authority's power in this regard is limited. The actual demand for parking facilities, moreover, will depend on how HSR ridership grows over time.

In light of the uncertainty over the need for station area parking, this EIR/EIS conservatively identifies parking facilities to meet the maximum forecast constrained parking demand for stations. This scenario is an upper bound on actual needs and discloses the maximum potential environmental impact. The Authority and FRA will therefore have the flexibility to make decisions, in consultation with local communities, about what parking facilities will be constructed initially, and how additional parking might be phased or adjusted depending on how HSR system ridership increases over time. For example, it is possible that some parking facilities might get constructed at the 2022 project opening, only to be replaced in whole or in part, or augmented later with development of other parking facilities.

2.7 Operations and Service Plan

2.7.1 HSR Service

Describe the HSR service plan for Phase 1, including:

- Three basic service types: express trains, limited-stop trains, and all-stop trains
- Daily station train service frequency and number
- Trip time, maximum operating speed, hours of operation, and station dwell times for the HSR Section
- Growth in train operations in response to projected ridership

Illustrate the relationship between projected ridership and growth in the number of trains in revenue service over time. Base the discussion and summary figure on information from the most recently adopted Authority Business Plan and Volume 2, Appendix 2-C, Operations and Service Plan Summary. Cite these sources and refer to Volume 1, Chapter 6, Project Costs and Operations, for detailed information. Since ridership assumptions and forecasts are updated by the Authority with each biennial Business Plan Update, coordinate with the Authority and PMT to obtain up-to-date information for this discussion. The following excerpt from the *Fresno to Bakersfield Section Final EIR/EIS* can be tailored for this discussion. Note that time-based and location-based content must be updated to reflect current information for the HSR section.

The conceptual HSR service plan for Phase 1 describes service between Anaheim/Los Angeles running through the Central Valley from Bakersfield to Merced, and traveling northwest into the Bay Area. Subsequent stages of the HSR system include a southern extension from Los Angeles to San Diego via the Inland Empire and an extension from Merced north to Sacramento.

Train service would run in diverse patterns between various terminals. Three basic service types are envisioned:

- Express trains, which would serve major stations only, providing fast travel times (for example, between Los Angeles and San Francisco during the morning and afternoon peak with a run time of 2 hours and 40 minutes)
- Limited-stop trains, which would skip selected stops along a route to provide faster service between stations
- All-stop trains, which would focus on regional service

The vast majority of trains would provide limited-stop services and offer a relatively fast run time along with connectivity among various intermediate stations. Numerous limited-stop patterns would be provided to achieve a balanced level of service at the intermediate stations. The service plan envisions at least four limited-stop trains per hour in each direction, all day long, on the

main route between San Francisco and Los Angeles. Each intermediate station in the Bay Area, Central Valley between Fresno and Bakersfield, Palmdale in the High Desert, and Sylmar and Burbank in the San Fernando Valley would be served by at least two limited-stop trains every hour—offering at least two reasonably fast trains an hour to San Francisco and Los Angeles. Selected limited-stop trains would be extended south of Los Angeles as appropriate to serve projected demand.

Including the limited-stop trains on the routes between Sacramento and Los Angeles, and Los Angeles and San Diego, and the frequent-stop local trains between San Francisco and Los Angeles/Anaheim, and Sacramento and San Diego, every station on the HSR network would be served by at least two trains per hour per direction throughout the day and at least three trains per hour during the morning and afternoon peak periods. Stations with higher ridership demand would generally be served by more trains than those with lower estimated ridership demand.

The service plan provides direct-train service between most station pairs at least once per hour. Certain routes may not always be served directly, and some passengers would need to transfer from one train to another at an intermediate station, such as Los Angeles Union Station, to reach their final destination. Generally, the Phase 1 conceptual operations and service plans offer a wide spectrum of direct-service options and minimize the need for passengers to transfer.

The following excerpt from the *Fresno to Bakersfield Section Final EIR/EIS* provides an example of the content for this discussion.

> *Figure 2-34 shows how projected ridership and the numbers of trains would grow over time for the high scenario of ridership. In 2020, the assumed first year of Phase 1 operation, 120 trains would operate daily. This would grow to 260 daily trains in 2026, and jump to 288 when the full statewide HSR system is anticipated to become operational, including the Merced to Sacramento and Los Angeles to San Diego sections. By 2035, 212 trainsets will be needed to operate 339 daily trains throughout the HSR system.*
>
> *Specifically for the Fresno to Bakersfield Section, estimated trip time would be approximately 40 minutes between Fresno and Bakersfield. The maximum operating speed would reach 220 mph in this section. Train service in the corridor is anticipated to run from around 6:00 a.m. to midnight. Non-service activities required to maintain the system are anticipated to occur during non-revenue service hours. The dwell time of trains at the intermediate stations for passenger unloading and loading is expected to be approximately 1.5 minutes.*
>
> *The Fresno, Kings/Tulare Regional, and Bakersfield stations would see a mix of stopping trains and through trains peaking for the full system. In 2035 for the high-ridership scenario, the full system would see four trains an hour stop at Fresno in each direction at the peak, and six trains run through. At the off-peak the same number of stops would be made, but the through trains would drop to three per hour. At the Kings/Tulare Regional Station, four trains would stop each hour per direction at the peak, with six running through. At the off-peak, four trains would stop at the station. At the Bakersfield Station, four trains would stop each hour per direction at the peak, with six running through. At the off-peak, four trains would stop in Bakersfield. For more detail, see Appendix 2-C, Operations and Service Plan Summary.*

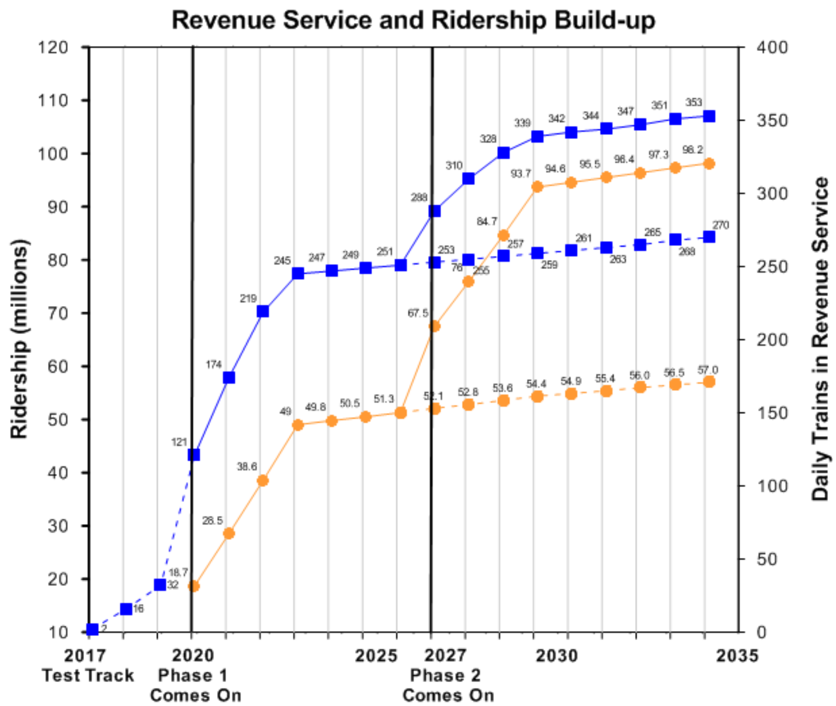


Figure 2-34 Revenue Service and Ridership Build-up (example only)

2.7.2 Maintenance Activities

Summarize the maintenance activities that the Authority will perform on HSR track and related operational facilities and infrastructure and the HSR right-of-way. Refer to the international and federal bases for the Authority's maintenance and inspection standards.

Briefly describe maintenance of the following HSR system elements, including anticipated cycle for maintenance and replacement within the 2040 project horizon:

- Track and right-of-way
- Power
- Structures
- Signaling, train control, and communications
- Stations
- Perimeter fencing and intrusion protection

The following excerpt from the *Fresno to Bakersfield Section Final EIR/EIS* can be tailored for this discussion. Note that time-based and location-based content must be updated to reflect current information for the HSR section.

The Authority would regularly perform maintenance along the track and railroad right-of-way as well as the power systems, train control, signalizing, communications, and other vital systems required for the safe operation of the HSR system. Maintenance methods are expected to be similar to those of existing European and Asian HSR systems, adapted to the specifics of the California HSR. However, FRA will specify standards of maintenance, inspection, and other items in a set of regulations (i.e., Rule of Particular Applicability) to be issued in the next several years, and the overseas practices may be amended in ways not currently foreseen. The brief descriptions of maintenance activities described below are thus based on best professional judgment about future practices in California.

- Track and Right-of-Way—The track at any point would be inspected several times a week using measurement and recording equipment aboard special measuring trains. These trains are of similar design to the regular trains but would operate at a lower speed. They would run between midnight and 5 a.m. and would usually pass over any given section of track once in the night.

  Most adjustments to the track and routine maintenance would be accomplished in a single night at any specific location with crews and material brought by work trains along the line. When rail resurfacing (i.e., rail grinding) is needed, perhaps several times a year, specialized equipment would pass over the track sections at 5 to 10 mph.

  Approximately every four to five years, ballasted track would require tamping. This more intensive maintenance of the track uses a train with a succession of specialized cars to raise, straighten, and tamp the track, and using vibrating "arms" to move and position the ballast under the ties. The train would typically cover a 1-mile-long section of track in the course of one night's maintenance. Slab track, which is expected to comprise track at elevated sections, would not require this activity. No major track components are expected to require replacement through 2035.

  Other maintenance of the right-of-way, aerial structures, and bridge sections of the alignment would include drain cleaning, vegetation control, litter removal, and other inspection that would typically occur monthly to several times a year.

- Power—The overhead contact system along the right-of-way would be inspected nightly, with repairs being made when needed, which would typically be accomplished during a single night maintenance period. Other inspections would occur monthly. Many of the functions and status of substations and smaller facilities outside of the trackway would be remotely monitored. However, visits would be made to repair or replace minor items and would also be scheduled several times a month to check the general site. No major component replacement for the overhead contact system or the substations is expected through 2035.
- Structures—Visual inspections of the structures along the right-of-way and testing of fire and life-safety systems and equipment in or on structures would occur monthly, while inspections of all structures for structural integrity would occur at least annually. Steel structures would also require painting every several years. For tunnels and buildings, repair and replacement of lighting and communication components would be performed on a routine basis. No major component replacement or reconstruction of any structures are expected through 2035.
- Signaling, Train Control, and Communications—Inspection and maintenance of signaling and train control components would be guided by FRA regulations and standards to be adopted by the Authority. Typically, physical in-field inspection and testing of the system would occur four times a year using hand-operated tools and equipment. Communication components would be routinely inspected and maintained, usually at night, although daytime work may occur if the work area is clear of the trackway. No major component replacement of these systems is expected through 2035.
- Stations—Each station would be inspected and cleaned daily. Inspections of the structures, including the platforms, would occur annually. Inspections of other major systems, such as escalators, the heating and ventilation system, ticket-vending machines, and closed-circuit television would be according to manufacturer recommendations. Major station components are not expected to require replacement through 2035.
- Perimeter Fencing and Intrusion Protection—Fencing and intrusion protection systems will be remotely monitored, as well as periodically inspected. Maintenance would occur as needed, however fencing or systems are not expected to require replacement before 2035.

2.8 Additional High-Speed Rail Development Considerations

2.8.1 High-Speed Rail, Land Use Patterns, and Development Around High-Speed Rail Stations

The following text is derived from the *Fresno to Bakersfield Section Final EIR/EIS* and can be tailored for the HSR section. Note that time-based and location-based content must be updated to reflect the current status of on-going activities.

In 2008, California voters approved Proposition 1A—essentially approving the California HSR System. Regarding urban development and land use patterns, voters specifically mandated that HSR stations "be located in areas with good access to local mass transit or other modes of transportation. The HSR system also shall be planned and constructed in a manner that minimizes urban sprawl and impacts on the natural environment" including "wildlife corridors."

In submitting Proposition 1A to the voters, the Legislature went further:

> "The continuing growth in California's population and the resulting increase in traffic congestion, air pollution, greenhouse gas emissions, and the continuation of urban sprawl make it imperative that the state proceed quickly to construct a state-of-the-art high-speed passenger train system to serve major metropolitan areas."

The Authority has embraced this voter and legislative direction. Figure 2-35, Figure 2-36, and Figure 2-37 show how the HSR System connects with existing transit service areas throughout the State of California. As the Authority's program EIR/EIS documents show and this EIR/EIS supports, operation of the HSR system by itself will reduce traffic congestion, air pollution, and greenhouse gas (GHG) emissions. The Authority believes, however, that this is not enough. The HSR will be most successful, and will best fulfill the intent of the voters and Legislature, if it is coordinated with sprawl-reducing and environment-improving land use development patterns. Accordingly, the Authority has adopted *HSR Station Area Development Policies* based on the following premise:

> "For the high-speed train to be more useful and yield the most benefit, it is important that the stations be placed where there will be a high density of population, jobs, commercial activities, entertainment, and other activities that generate personal trips. The success of HSR is highly dependent on land use patterns that also reduce urban sprawl, reduce conversion of farm land to development, reduce vehicle miles traveled (VMT) by automobiles, and encourage high-density development in and around the HSR station."

The Authority and its Station Area Development Policies specifically advocate:

- Higher density development in relation to the existing pattern of development in the surrounding area, along with minimum requirements for density.
- A mix of land uses (e.g., retail, office, hotels, entertainment, residential) and a mix of housing types to meet the needs of the local community.
- Compact pedestrian-oriented design that promotes walking, bicycle, and transit access with streetscapes that include landscaping, small parks, and pedestrian spaces.
- Limits on the amount of parking for new development and a preference that parking be placed in structures. TOD areas typically have reduced parking requirements for retail, office, and residential uses due to their transit and bicycle access, walkability, and potential for shared parking. Sufficient train passenger parking would be essential to the system viability, but this would be offered at market rates (not free) to encourage the use of access by transit and other modes.

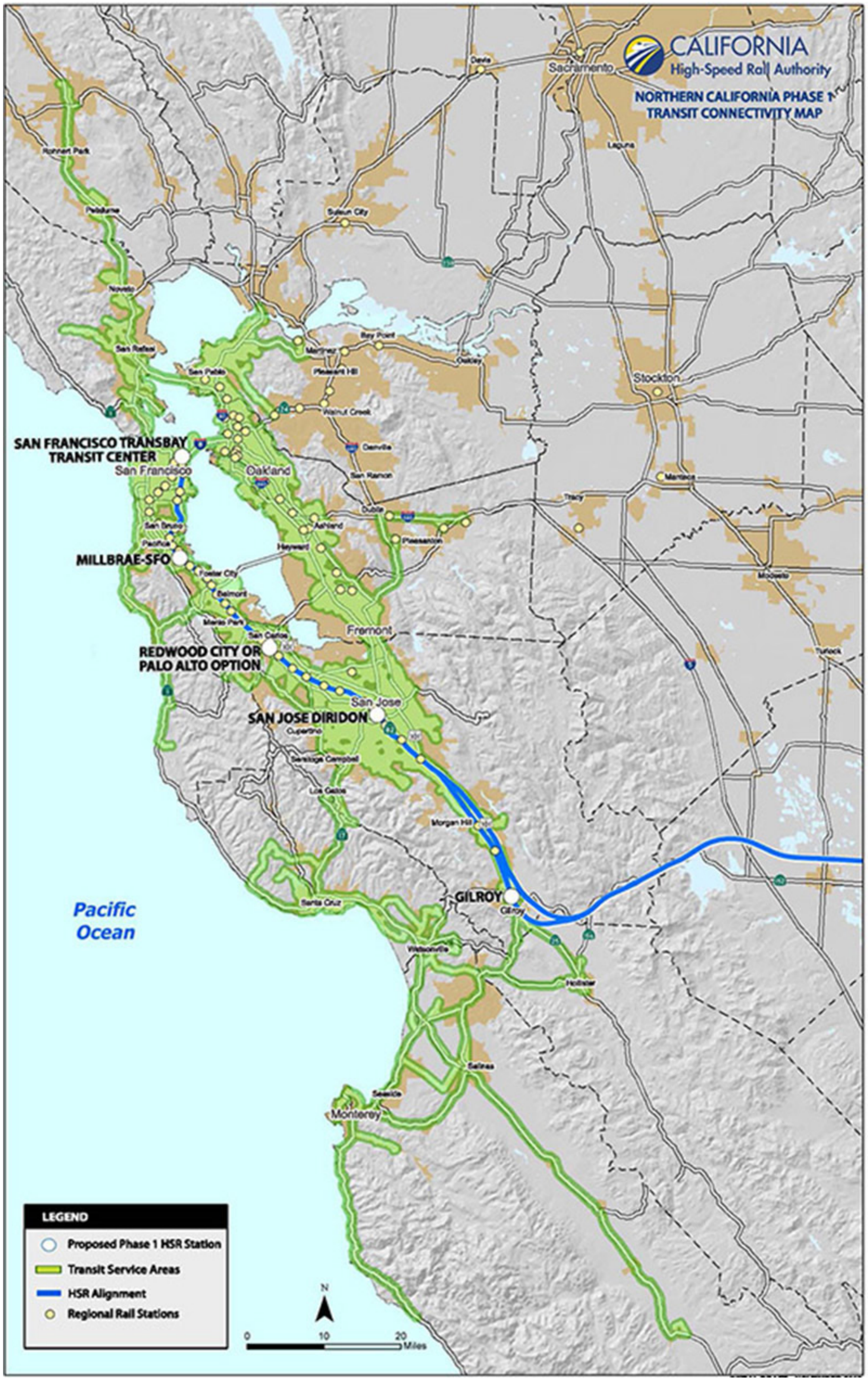


Figure 2-35 Northern California Phase 1 Transit Connectivity Map (example only)

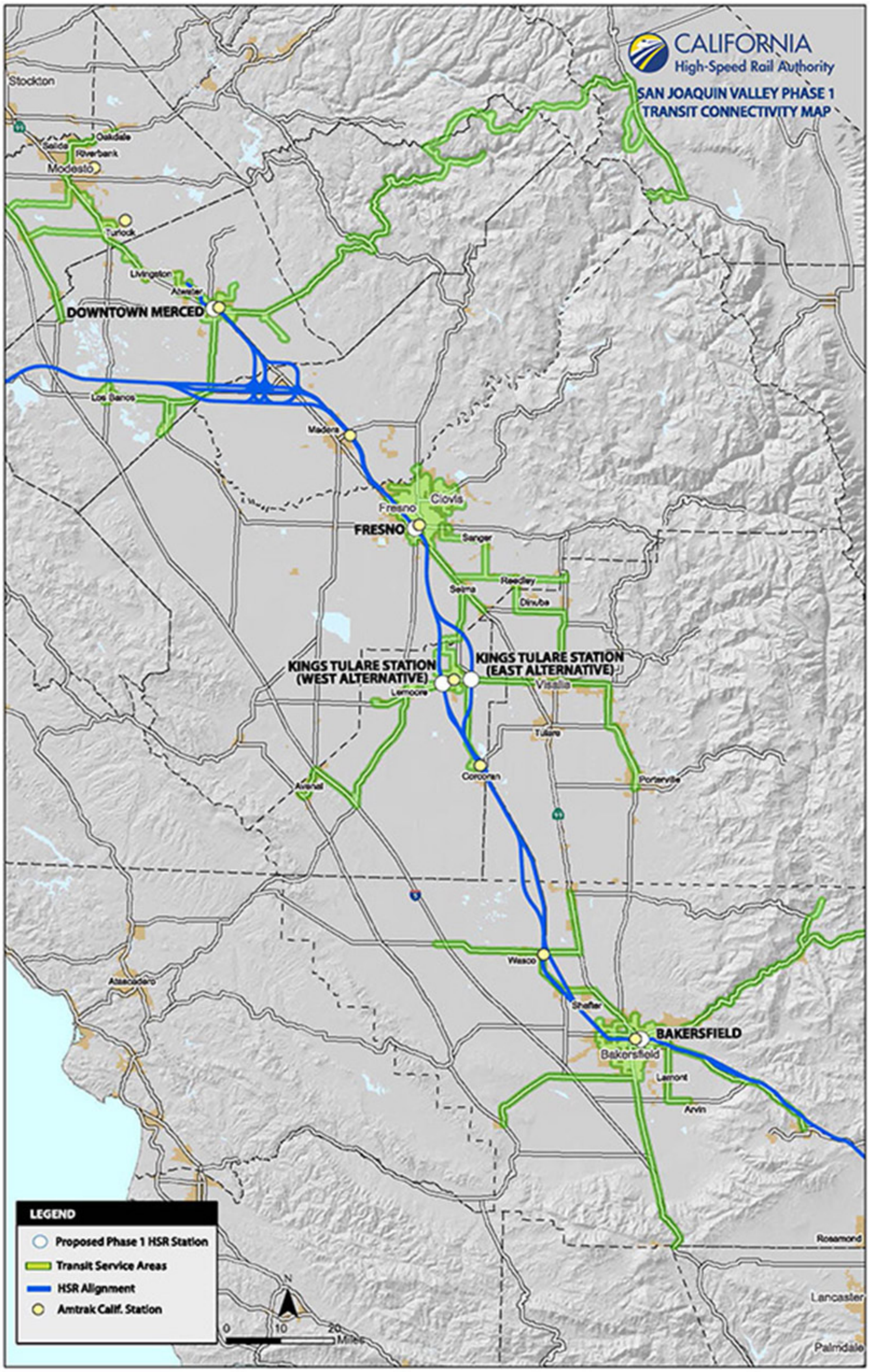


Figure 2-36 San Joaquin Valley Phase 1 Transit Connectivity Map (example only)

Figure 2-37 Southern California Phase 1 Transit Connectivity Map (example only)

- Infill development—namely, development around HSR stations on land that is already disturbed by existing development, parking lots, pavement, etc., rather than development on previously undisturbed land or on farmland. The Authority, therefore, prefers to locate its stations in existing developed areas, particularly city centers.

The Authority recognizes that land use development around HSR stations is controlled by local government and the market, and is influenced by land owners and public-interest groups. The Authority also recognizes that local transit is controlled by regional and local transit agencies. The Authority is committed, therefore, to working cooperatively with local government, transit agencies, public-interest groups, and the development community to realize a shared vision for land use and transit development around HSR stations consistent with the Authority's Development Policies, to the maximum extent possible.

Good land use planning helps ensure good land use development. Planning for infill development, however, is particularly complicated. Infill areas (e.g., established downtowns) typically involve numerous small parcels with different property owners. Therefore, no single property owner exists to pay for the planning. Government typically has to fund it. The economic downturn and the State's elimination of redevelopment agencies, however, have left local government resources particularly limited. Accordingly, the Authority has committed to utilize its resources, both financial and otherwise, to encourage good local government land use planning around HSR stations consistent with the above principles.

The Authority believes that implementation of its Station Area Development Policies, and cooperative work with local government (including funding for planning), will result in the types of environmental benefits voters and the Legislature contemplated in 2008. This EIR/EIS forecasts that the HSR will reduce VMT and related GHG emissions, reduce energy use, reduce traffic congestion, and improve air quality. To be conservative and consistent with CEQA and NEPA requirements, these forecasts generally do not account for the additional benefit to these areas expected from more compact development patterns—patterns which the Authority's Station Area Development Policies support. The Authority began the "Vision California" study effort, with funds provided by the California Strategic Growth Council and the Authority, to help account for these additional sustainability benefits that would exceed benefits reported in this EIR/EIS.

Vision California was a first-of-its-kind effort to explore the role of land use and transportation investments in meeting the environmental, fiscal, and public-health challenges facing California over the coming decades. The project produced new scenario development and analysis tools to examine the impacts of varying policy decisions and development patterns associated with accommodating the expected dramatic increase in California's population by 2050. Vision California's tools quantitatively illustrate the connections between land use patterns, water and energy use, housing affordability, public health, air quality, GHG emissions, farmland preservation, infrastructure investment, and economic development. The tools allow state agencies, regions, local governments and the nonprofit community to measure the impacts of land use and transportation investment scenarios. More information about the Vision California project and the final Vision California Report can be found at http://visioncalifornia.org/index.php.

Vision California involves two different models developed by Calthorpe Associates. An open source geo-spatial model called UrbanFootprint is map-based and analyzes detailed base and scenario data at the 5.5-acre level across most parts of the state. The model is scalable to conduct analyses of local and regional land use and infrastructure decisions. Version 1 of the UrbanFootprint model is use by the Sacramento Area Council of Governments, South Coast Association of Governments, and San Diego Association of Governments for updating their Regional Transportation Plans and preparing Sustainable Communities Strategies. Another tool, called "Rapid Fire," has been deployed statewide and in regions across California. Two Vision California statewide growth scenarios—Business as Usual and Growing Smarter—were developed and analyzed in the Vision California process using RapidFire. Business as Usual assumes

continuation of the past trend of less compact development patterns. Growing Smarter assumes an increasing proportion of urban infill and compact growth.

The Growing Smarter scenario is closely linked to implementation of the HSR system and supportive feeder transit services. This relationship is particularly true in regions of the state that currently lack high-quality transit facilities, such as the San Joaquin Valley, where realization of the level of urban and compact growth envisioned in the Growing Smarter scenario would not occur without the significant investment and mobility enhancements represented by the California HSR System.

Rapid Fire predicts that by 2050, implementation of more-compact growth of the Growing Smarter scenario would:

- Save over $7,300 per household annually on automobile costs and utility bills
- Save $1.1 billion per year from lower infrastructure costs for new homes
- Save 18 million acre-feet of water by 2050—enough water to fill Hetch Hetchy Reservoir 50 times
- Cut residential and commercial building energy use by 15 percent—enough to power all homes in California for 8 years
- Save over 3,700 square miles of land by 2050—more than Rhode Island and Delaware combined
- Reduce fuel consumption through 2050 equivalent to 2 years of the USA's oil imports, which amounts to a household savings of $2,600 per year per household
- Reduce GHG emissions equivalent to the emissions offset by a forest a quarter the size of California
- Reduce pollution-related respiratory disease, saving more than $1.6 billion annually
- Reduce passenger vehicle travel by more than 4 trillion miles, the equivalent of taking all cars off California's roads for 15 years

Construction of the California HSR System, coupled with successful implementation of the Authority's Station Area Development Policies, would serve to reinforce cities as hubs of economy and future growth and would save land and water, reduce energy use, improve air quality, and save money. The initial findings of the Vision California study suggest that these benefits could be substantial and would help California meet its sustainability goals.

2.8.2 Right-of-Way Acquisition for Construction, Operation, and Maintenance of High-Speed Rail

Briefly explain, in text and illustrative graphics, the Authority's process for acquiring property and right-of-way (ROW) (collectively) to construct, secure, operate, and maintain the HSR system and associated facilities. Base the description upon the Authority ROW manual (or other applicable guidance,[30] as directed by the Authority), including the following information:

- HSR section ROW acquisition plan, including process and parameters for implementation
- Milestones in the ROW acquisition process[31]
- Permit to Enter process for private property[32]

[30] As of June 2014, see the *Interim Policy to Reference Caltrans' Right of Way Manual* on the Authority website www.hsr.ca.gov/docs/programs/construction/RFP_AD1_B3-PtC5_InterimPolicyROW.pdf
[31] See Authority website, www.hsr.ca.gov/docs/programs/private_property/ROW_Process_2014.pdf

- Relocation Assistance Program for residences,[33] mobile homes,[34] businesses, farms, and non-profit organizations[35]

2.9 Construction Plan and Phased Implementation Strategy

The following text is derived from the *Fresno to Bakersfield Section Final EIR/EIS* and can be tailored for the construction plan discussion. Note that time-based and location-based content must be updated to reflect the activity and schedule information relevant to the HSR section.

This section summarizes the general approach to building the HSR system, including activities associated with pre-construction and construction of major system components and describes the Authority's phased implementation strategy. To maintain its eligibility for federal American Recovery and Reinvestment Act (ARRA) funding, the Authority started final design in fall 2013 intends to begin project construction in 2014. First construction of the IOS (also known as the First Construction Section (FCS)) is to be completed by December 2018. Service on the IOS is expected to start in 2022.

2.9.1 Design/Build Project Delivery

The [section name] Section would be built using a "design-build" (D/B) approach. This method of project delivery involves a single contract with the project owner to provide final design and construction services. This differs from the "design-bid-build" approach, where design and construction services are managed under separate contracts and the design is completed before the project is put out for construction bids. The D/B approach offers more flexibility to adapt the project to changing conditions. The contract with the D/B contractor will require compliance with standard engineering design and environmental practices and regulations, as well as implementation of any project design features and applicable mitigation measures included in this EIR/EIS.

The Authority plans to construct the IOS of the HSR between Madera and Shafter that would ultimately extend south to the San Fernando Valley. The Central Valley portion would be the backbone of the HSR System that will tie major regions of California together. The Fresno to Bakersfield Section has been divided into a number of construction packages (CP):

- CP1c is the portion of CP 1 that occurs from just south of the Fresno Station to East American Avenue and is located completely within the metropolitan Fresno area. The construction of CP1c is planned to commence in fall 2014. CP1a and CP1b are located in the Merced to Fresno Section. CP 1 includes infrastructure and civil works.
- CP 2/3 extends from East American Avenue to 1 mile north of the Tulare/Kern County Line. This construction package crosses Fresno, Kings, and Tulare counties and is planned to commence in spring 2015. CP 2/3 includes associated infrastructure and civil works.
- CP 4 extends from 1 mile north of the Tulare/Kern County Line to 7th Standard Road south of the city of Shafter in Kern County. The CP 4 schedule is currently in development. CP 4 includes associated infrastructure and civil works.
- CP 5 extends from the northern terminus of CP 1 in the Merced to Fresno Section (Avenue 17 in the city of Madera) to the southern terminus of CP 4 for the Fresno to Bakersfield Section (7th Standard Road south of the city of Shafter). CP 5 would include the railroad infrastructure, OCS, and positive train control and track and would be limited to the project footprint covered by CP 1, CP 2/3, and CP 4.

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[32] See Authority website, www.hsr.ca.gov/docs/programs/private_property/PTE_Process_Private_Property_FINAL_053014.pdf
[33] See Authority website, www.hsr.ca.gov/docs/programs/private_property/RAP_Information_for_Residential.pdf
[34] See Authority website, www.hsr.ca.gov/docs/programs/private_property/RAP_Information_for_Mobile_Homes.pdf
[35] See Authority website, www.hsr.ca.gov/docs/programs/private_property/RAP_Information_for_Business.pdf

2.9.2 Phased Implementation Strategy

The Authority has prioritized a portion of the Merced to Fresno and the Fresno to Bakersfield Project sections as the first section of the California HSR System to be built for a number of reasons, including meeting the ARRA funding requirements, which includes a funding deadline of September 30, 2017. In addition, the FRA grant agreement includes the requirement that the federal investment demonstrate "independent utility" as that term is defined in the *High Speed Intercity Passenger Rail Notice of Funding Availability and Interim Program Guidance* (74 Fed. Reg. 29900, 29905). Full implementation of HSR service on the IOS would satisfy this "independent utility" requirement, but so would earlier phases of rail service on the ICS. For example, the IOS first construction/ICS presents an opportunity for immediate use for improved and faster service on the San Joaquin intercity line prior to the initiation of HSR service on the IOS in 2022, thus providing for independent utility consistent with the FRA grant agreement. This scenario, which, if implemented, would be led by another state agency, involves the through operation of existing Amtrak San Joaquin service by shifting some of these trains from the existing route on the BNSF to the ICS between just south of the Madera Amtrak station and just north of Bakersfield. It would utilize the same civil and track infrastructure as would subsequent HSR service and any cross-over tracks necessary to connect the BNSF and ICS would occur within the project footprint analyzed in this EIR/EIS. Other interim/phased-in service scenarios are conceivable (i.e., scenarios for use of the ICS prior to the Authority implementing full HSR revenue service on the IOS) that also would utilize the same track and civil infrastructure or would occur within the project footprint analyzed in this EIR/EIS. These interim operating options do not change the project analyzed in the EIR/EIS. Neither do they constitute alternatives to the Fresno to Bakersfield project. Rather, they are simply representative scenarios of possible phasing-in options prior to the Authority implementing full revenue service on the IOS.

More information about phased implementation is contained in Final EIR/EIS Standard Response FB-Response-GENERAL-13 and Appendix 2-F, Interim Use/Phased Implementation.

The Central Valley was determined to be the best location for the initial construction, with service extending south to Palmdale and the San Fernando Valley and north to San Jose to link with blended service to Metrolink in the south and Caltrain in the north. The Authority has demonstrated that it can meet the "independent utility" requirement of the federal stimulus financing because the IOS first construction track would have dedicated passenger track capable of higher speeds, thereby improving existing San Joaquin operations. It would also include a basic station design (platform) for non-electrified passenger service in Fresno (located at the planned Fresno Station).

Upgrades for the San Joaquin service and the potential for environmental impact would be further assessed, if necessary, by the operating agency prior to service initiation.

2.9.3 General Approach

Upon receiving the required environmental approvals and securing needed funding, the Authority would begin implementing its construction plan. Given the size and complexity of the HSR project, the design and construction work could be divided into a number of procurement packages. In general, the procurement would address the following:

- Civil/structural infrastructure, including design and construction of passenger stations, maintenance facilities, and right-of-way facilities
- Trackwork, including design and construction of direct fixation track and sub-ballast, ballast, ties and rail installation, switches, and special trackwork
- Core systems, such as traction power, train controls, communications, the operations center, and the procurement of rolling stock

One or more D/B packages would be developed and the Authority would then issue construction requests for proposals, start right-of-way acquisition, and procure construction management services to oversee physical construction of the project. During peak construction periods, work is envisioned to be underway at several locations along the route, with overlapping construction of various project elements. Working hours and workers present at any time would vary depending on the activities being performed. Where construction fencing is required, it would be restricted to areas designated for construction staging and areas where public safety is an issue. No fencing would be used across the Kern River. Though the D/B contractor will set the actual schedule, the approximate schedule for construction is provided in Table 2-8.

Consistent with the Memorandum of Understanding (MOU) for Achieving an Environmentally Sustainable High-Speed Train System in California (Authority, FRA, U.S. Department of Housing and Urban Development, Federal Transit Administration, and EPA 2011), the Authority intends to build the project using sustainable methods that:

- Minimize use of nonrenewable resources
- Minimize the impacts on the natural environment
- Protect environmental diversity
- Protect, maintain, conserve, and restore wildlife corridors and habitat
- Emphasize using renewable resources in a sustainable manner. An example of this approach would be the use of material recycling for project construction (e.g., asphalt, concrete, or Portland Cement Concrete, excavated soil)

Fill material would be excavated from local borrow sites and travel by truck from 10 to 40 miles to the HSR alignment. Railroad ballast would be drawn from existing, permitted quarries located from the Bay Area to Southern California. Ballast would be delivered by a combination of rail and trucks. All materials would be suitable for construction purposes and free from toxic pollutants in toxic amounts in accordance with Section 307 of the Clean Water Act.

Applicable design standards, including compliance with laws, regulations, and industry standard practices, are included in Appendix 2-D and are considered a part of the project.

2.9.4 Pre-Construction Activities

During final design, the Authority and its contractor would conduct a number of pre-construction activities to determine how best actual construction should be staged and managed. These activities include the following:

- Conducting geotechnical investigations that would focus on defining precise geology, groundwater, seismic, and environmental conditions along the alignment. The results of this work would guide final design and construction methods for foundations, underground structures, tunnels, stations, grade crossings, aerial structures, systems, and substations.
- Identifying construction laydown and staging areas used for mobilizing personnel, stockpiling materials and storing equipment for building HSR or related improvements. In some cases, this area is also used to assemble or pre-fabricate components of guideway or wayside facilities before transport to installation locations. Also identify precasting yards, which would be needed for the casting, storage, and preparation of precast concrete segments, temporary spoil storage, workshops, and the temporary storage of delivered construction materials. Field offices and temporary jobsite trailers would also be located at the staging areas. Construction laydown areas are part of the project footprint that is evaluated for potential environmental impacts, yet actual use of the area is left to the discretion of the D/B contractor. After conclusion of construction, the staging, laydown and precasting areas would be restored to pre-construction condition.

Table 2-8 Approximate Construction Schedule (example only) [1, 2]

Activity	Tasks	Duration
Right-of-way Acquisition	Proceed with right-of-way acquisitions once State Legislature appropriates funds in annual budget	March 2013–March 2015
Survey and Preconstruction	Locate utilities, establish right-of-way and project control points and centerlines, establish or relocate survey monuments	March 2013–October 2013
Mobilization	Safety devices and special construction equipment mobilization	April 2014–July 2014
Site preparation	Utilities relocation; clearing/grubbing right-of-way; establishment of detours and haul routes; preparation of construction equipment yards, stockpile materials, and precast concrete segment casting yard	July 2014–November 2014 (two site preparation periods)
Earth moving	Excavation and earth support structures	November 2014–November 2016
Construction of ROAD CROSSINGS	Surface street modifications, grade separations	November 2014–November 2016
Construction of aerial structures	Aerial structure and bridge foundations, substructure, and superstructure	November 2014–January 2017
Track laying	Includes backfilling operations and drainage facilities	November 2016–July 2017
Systems	Train control systems, overhead contact system, communication system, signaling equipment	November 2016—May 2019
Demobilization	Includes site cleanup	October 2016–April 2017 (two demobilization periods)
HMF Phase 1 [3]	Test track assembly and storage	May 2017–November 2018
HMF Phase 2 [3]	Test track light maintenance facility	May 2017–December 2018
Maintenance-of-way facility	Potentially collocated with HMF [1]	May 2017–November 2018
HMF Phase 3 [3] (Merced to Fresno or Fresno to Bakersfield only)	Heavy Maintenance Facility	May 2017—November 2018
HSR stations	Demolition, site preparation, foundations, structural frame, electrical and mechanical systems, finishes	Fresno: June 2017–April 2020 Kings/Tulare Regional: June 2020—June 2023 [4] Bakersfield: June 2018—April 2021

[1] Based on a two-phase implementation of the project: first construction will meet the ARRA funding deadline and be completed in 2017; the remainder of the Initial Operating Segment will be completed by 2022 per the Business Plan and based on anticipated funding flow.
[2] Final design will be completed by the design-build contractor following contract award and issuance of the Notice to Proceed for each construction package.
[3] HMF would be sited in either the Merced to Fresno or Fresno to Bakersfield Section.
[4] Right-of-way would be acquired for the Kings/Tulare Regional Station; however, the station itself would not be part of initial construction.

- Initiating site preparation and demolition, such as clearing, grubbing, and grading, followed by the mobilization of equipment and materials. Demolition would require strict controls to ensure that adjacent buildings or infrastructure are not damaged or otherwise affected by the demolition efforts.
- Relocating utilities, where the contractor would work with the utility companies to relocate or protect in place high-risk utilities as overhead tension wires, pressurized transmission mains, oil lines, fiber optics, and communications prior to construction.
- Implementing temporary, long-term, and permanent road closures to re-route or detour traffic away from construction activities. Handrails, fences, and walkways would be provided for the safety of pedestrians and bicyclists.
- Locating temporary batch plants that would be required to produce Portland Cement Concrete or asphaltic concrete needed for roads, bridges, aerial structures, retaining walls, and other large structures. The facilities generally consist of silos containing fly ash, lime, and cement; heated tanks of liquid asphalt; sand and gravel material storage areas; mixing equipment; aboveground storage tanks; and designated areas for sand and gravel truck unloading, concrete truck loading, and concrete truck washout. The contractor would be responsible for implementing procedures for reducing air emissions, mitigating noise impacts, and reducing the discharge of potential pollutants into storage drains or watercourses from the use of equipment, materials, and waste products.
- Conducting other studies and investigations, as needed, such as local business or agriculture surveys to identify usage, delivery, shipping patterns, and critical times of the day or year for business, planting or harvesting activities. This information would help develop construction requirements and worksite traffic control plans, and will identify potential alternative routes, cultural resource investigations, and historic property surveys.

2.9.5 Major Construction Activities

Four major types of construction activities are briefly described below.

2.9.5.1 Earthwork

Earth support is an important factor in constructing deep excavations that will be encountered on several alignment sections. It is anticipated that the following excavation support systems may be used along the route. There are three general excavation support categories, which are described below.

- Open Cut Slope—Open cut slope is used in areas where sufficient room is available to open-cut the area and slope the sides back to meet the adjacent existing ground. The slopes are designed similar to any cut slope, taking into account the natural repose angle of adjacent ground material and global stability.
- Temporary—Temporary excavation support structures are designed and installed to support vertical or near vertical faces of the excavation in areas where room to open-cut does not exist. This structure does not contribute to the final load carrying capacity of the tunnel or trench structure and is either abandoned in place or dismantled as the excavation is being backfilled. Generally, it consists of soldier piles and lagging, sheet pile walls, slurry walls, secant piles, or tangent piles.
- Permanent—Permanent structures are designed and installed to support vertical or near vertical faces of the excavation in areas where room to open-cut does not exist. This structure forms part of the permanent final structure. Generally it consists of slurry walls, secant piles, or tangent pile walls.

2.9.5.2 Bridge, Aerial Structure, and Road Crossing Construction

Similar to existing HSR systems around the world, it is anticipated that the elevated guideways will be designed and built as single box segmental girder construction. Where needed, other structural types will be considered and used, including steel girders, steel truss, and cable-supported structures.

- Foundations—A typical aerial structure foundation pile cap is supported by an average of four large diameter bored piles with diameters ranging from 5 to 9 feet. Depth of piles depends on geotechnical site conditions. Pile construction can be achieved by using rotary drilling rigs, and either bentonite slurry or temporary casings may be used to stabilize pile shaft excavation. The estimated pile production rate is 4 days per pile installation. Additional pile installation methods available to the contractor include bored piles, rotary drilling cast-in-place piles, driven piles, and a combination of pile jetting and driving.

  Upon completing the piles, pile caps can be constructed using conventional methods. For pile caps constructed near existing structures such as railways, bridges, and underground drainage culverts, temporary sheet piling (i.e., temporary walls) can be used to minimize disturbances to adjacent structures. It is anticipated that sheet piling installation and extraction is achieved using hydraulic sheet piling machines.

- Substructure—Aerial structures with pier heights ranging from 20 to 90 feet may be constructed using conventional jump form and scaffolding methods. A self-climbing formwork system may be used to construct piers and portal beams over 90 feet high. The self-climbing formwork system is equipped with a winched lifting device, which is raised up along the column by hydraulic means with a structural frame mounted on top of the previous pour. In general, a 3-day cycle for each 12 feet pour height can be achieved. The final size and spacing of the piers depends on the type of superstructure and spans they are supporting.

- Superstructure—It will be necessary to consider the loadings, stresses, and deflections encountered during the various intermediate construction stages, including changes in static scheme, sequence of tendon installation, maturity of concrete at loading, and load effects from erection equipment. As a result, the final design will depend on the contractor's means and methods of construction and can include several different methods, such as a span-by-span, incrementally launched, progressive cantilever, and balanced cantilever.

Road crossings of existing railroads, roads, and the HSR would be constructed on the line of the existing road or offline at some locations. When constructed online, the existing road would be closed or temporarily diverted. When constructed offline, the existing road would be maintained in use until the new crossing is completed. Where new roadway undercrossings of existing railroads are required, a temporary shoofly track would be constructed to maintain railroad operations during undercrossing construction.

Construction of foundations and substructure would be similar to that for the aerial structures, but reduced in size. The superstructure would likely be constructed using precast, prestressed, concrete girders and cast-in-place deck. Approaches to the bridges would be earthwork embankments, mechanically stabilized earth wall, or other retaining structures.

2.9.5.3 Tunnels

Describe tunnel construction proposed for the HSR Section, where applicable.

2.9.5.4 Railroad Systems Construction

The railroad systems are to include trackwork, traction electrification, signaling, and communications. After completion of earthwork and structures, trackwork is the first rail system to be constructed, and it must be in place at least locally to start traction electrification and railroad signalizing installation. Trackwork construction generally requires the welding of

transportable lengths of steel running onto longer lengths (approximately 0.25 mile), which are placed in position on crossties or track slabs and field-welded into continuous lengths..

Both tie and ballast as well as slab track construction would be used. Tie and ballast construction, which would be used for at-grade and minor structures, typically uses cross ties and ballast that are distributed along the trackbed by truck or tractor. In sensitive areas, such as where the HSR is parallel to or near streams, rivers, or wetlands, and in areas of limited accessibility, this operation may be accomplished by using the established right-of-way with material delivery via the constructed rail line. For major civil structures, slab track construction would be used. Slab track construction is a non-ballasted track form employing precast track supports.

Traction electrification equipment to be installed includes TPSSs and the overhead contact system. TPSSs are typically fabricated and tested in a factory, then delivered by tractor-trailer to a prepared site adjacent to the alignment. It is assumed that substations are to be located every 30 miles along the alignment. The overhead contact system is assembled in place over each track and includes poles, brackets, insulators, conductors, and other hardware.

Signaling equipment to be installed includes wayside cabinets and bungalows, communications towers, wayside signals (at interlocking), switch machines, insulated joints, impedance bounds, and connecting cables. The equipment will support automatic train protection, enhanced ATC, and positive train control to control train separation, routing at interlocking, and speed.

2.9.5.5 Station Construction

As HSR stations for the Fresno to Bakersfield Section would be newly constructed, existing train operations, including station capacity and passenger levels of service, would be maintained during construction. HSR stations require significant coordination and planning to accommodate safe and convenient access to existing businesses and residences and to accommodate traffic control during construction periods. Additional information about the station areas is provided in Section 2.5.3. The typical construction sequence would be:

- **Demolition and Site Preparation**—The contractor would be required to construct detour roadways, new station entrances, construction fences and barriers, and other elements required as a result of taking existing facilities on the worksite out of service. The contractor would be required to perform street improvement work, site clearing and earthwork, drainage work, and utility relocations. Additionally, substations and maintenance facilities are assumed to be newly constructed structures. For platform improvements or additional platform construction, the contractor may be required to realign existing track.
- **Structural Shell and Mechanical/Electrical Rough-Ins**—For these activities, the contractor would construct foundations and erect the structural frame for the new station, enclose the new building, or construct new platforms and connect the structure to site utilities. Additionally, the contractor would rough-in electrical and mechanical systems and install specialty items such as elevators, escalators, and ticketing equipment.
- **Finishes and Tenant Improvements**—The contractor would install electrical and mechanical equipment, communications and security equipment, finishes, and signage. Additionally, the contractor may install other tenant improvements if requested.

2.10 Permits and Approvals

Describe the process for establishing agreements with environmental resource agencies (federal, state, regional, and local) to facilitate environmental permitting. Identify any relevant MOUs or memorandum of agreements already established. Acknowledge that as a state agency, the Authority is exempt from local general plan and zoning requirements. The Authority is also exempt from most permit requirements, but will seek certain local permits as part of construction processes to coordinate construction activities with local jurisdictions.

Provide the inventory of major federal, state, and regional environmental permits or approvals that are required for delivery of the HSR project. The following text is derived from the *Fresno to Bakersfield Section Final EIR/EIS* and must be tailored for the permit inventory, in particular those of regional and local agencies. Coordinate with the Authority and PMT to determine the present circumstances of agency agreements, Surface Transportation Board role(s), and application of state laws and regulations.

The Authority and FRA have prepared or are in the process of preparing agreements with environmental resource agencies to facilitate the environmental permitting required during final design and construction. These agreements—a Memorandum of Understanding and a Memorandum of Agreement or Programmatic Agreement—will clearly identify the Authority's responsibilities in meeting the permitting requirements of the federal, state, and regional environmental resource agencies. A Memorandum of Agreement was established in 2010 between the Authority, FRA, USACE, and EPA (Authority et al. 2010) regarding integration of NEPA, Clean Water Act Section 404, and Rivers and Harbors Act Section 14 processes. Coordination with the U.S. Coast Guard was conducted and the U.S. Coast Guard indicated that this project is not within their jurisdiction (Sulouff 2011).

Table 2-9 lists the major environmental permits required for the HSR Projects (as of September 2013). The table identifies each agency's status as a NEPA cooperating agency or CEQA responsible agency. As a state agency, the Authority is exempt from local permit requirements; however, in order to coordinate construction activities with local jurisdictions, the Authority will seek local permits as part of construction processes consistent with local ordinances. The agencies identified in the table are anticipated to rely on the EIR/EIS documents to support their permitting and approval processes.

Table 2-9 Potential Major Environmental Permits and Approvals

Agency	Permit
Federal	
U.S. Army Corps of Engineers (NEPA cooperating agency)	▪ Section 404 Permit for Discharge of Dredge or Fill Materials into Waters of the U.S., including wetlands ▪ Section 10 Permit for Construction of any Structure in or over any Navigable Water of the United States
U.S. Department of Interior/Federal Railroad Administration	Section 4(f) of the U.S. Transportation Act of 1966
U.S. Department of Interior/National Park Service	Section 6(f) of the Land and Water Conservation Fund Act of 1965
U.S. Advisory Council on Historic Preservation via the California State Historic Preservation Office	Section 106 Consultation (National Historic Preservation Act of 1966)
U.S. Environmental Protection Agency	▪ Review of Environmental Justice conclusions ▪ General Conformity Determination
U.S. Fish and Wildlife Service	Section 7 Consultation and Biological Opinion
National Marine Fisheries Service	Section 7 Consultation and Biological Opinion
Surface Transportation Board (NEPA cooperating agency)	Authority to construct and operate new rail line

Table 2-9 Potential Major Environmental Permits and Approvals (continued)

Agency	Permit
State	
California Department of Fish and Wildlife (CEQA responsible agency)	▪ California Endangered Species Act permits ▪ California Department of Fish and Wildlife Section 1602 Lake and Streambed Alteration Agreement ▪ Use of Title 14 lands—Allensworth Ecological Reserve
California Department of Transportation (Caltrans) (CEQA responsible agency)	Caltrans Encroachment Permits
California Public Utilities Commission (CEQA responsible agency)	Approval for construction and operation of railroad crossing of public road and for construction of new transmission lines and substations
California State Lands Commission (CEQA responsible agency)	Lease for crossing state sovereign lands
State Water Resources Control Board, Central Valley Regional Water Quality Control Board (CEQA responsible agencies)	▪ Clean Water Act Section 401 Water Quality Certification ▪ Section 402 National Pollutant Discharge Elimination System (NPDES) Water Discharge Permit ▪ Dewatering permit (Order No. 98-67) ▪ Spill Prevention, Control, and Countermeasure (SPCC) Plan (part of Section 402 process) ▪ Stormwater Construction and Operation Permit
Central Valley Flood Protection Board (CEQA responsible agency)	Title 23 California Code of Regulations, Section 2, and Title 33 Code of Federal Regulations, Section 208.10 (flood protection facilities)
Regional: Fresno to Bakersfield	
San Joaquin Valley Air Pollution Control District (CEQA responsible agency)	Rule 201 General Permit Requirements, Rule 403 Fugitive Dust, Rule 442 Architectural Coatings, Rule 902 Asbestos, and Rule 9510 Indirect Source Review
Regional: Merced to Sacramento	
Sacramento Metropolitan Air Quality Management District	Rule 201 General Permit Requirements, Rule 403 Fugitive Dust, Rule 442 Architectural Coatings, and Rule 902 Asbestos
Central Valley Regional Water Quality Control Board	▪ Dewatering permit (Order No. 98-67) ▪ Spill Prevention, Control, and Countermeasure (SPCC) Plan (part of Section 402 process) ▪ Stormwater Construction and Operation Permit
▪ Sacramento Area Flood Control Agency ▪ San Joaquin Area Flood Control Agency ▪ San Joaquin County Flood Control and Water Conservation District ▪ Reclamation Districts 404 and 17 ▪ Lower San Joaquin Levee District	Section 408 Approval to alter or modify a facility or feature of any federal project levee or federally regulated flood control system.

Table 2-9 Potential Major Environmental Permits and Approvals (continued)

Agency	Permit
Regional: San Francisco to San Jose	
Bay Area Air Quality Management District	Rule 201 General Permit Requirements, Rule 403 Fugitive Dust, Rule 442 Architectural Coatings, and Rule 902 Asbestos
San Francisco Bay Regional Water Quality Control Board	▪ Clean Water Act Section 401 Water Quality Certification ▪ Section 402 National Pollutant Discharge Elimination System (NPDES) Water Discharge Permit ▪ Dewatering permit (Order No. 98-67) ▪ Spill Prevention, Control, and Countermeasure (SPCC) Plan (part of Section 402 process) ▪ Stormwater Construction and Operation Permit
▪ Redwood City ▪ San Mateo County ▪ Santa Clara Valley Water District	Section 408 Approval to alter or modify a facility or feature of any federal project levee or federally regulated flood control system.
Bay Conservation and Development Commission	Development Permit

2.11 Products

The RC is responsible for preparing the following products, under Authority and FRA direction, according to PMT guidance and subject to PMT quality control and assurance:

2.11.1 Project EIR/EIS Volumes

1. Volume 1, Summary for EIR/EIS Executive Summary
2. Volume 1, Alternatives Chapter for the EIR/EIS
3. Volume 2, Appendix 2-D Applicable Design Standards: include all standards applied through Project Design Features selected for the HSR section
4. Volume 2, Appendix 2-E Project Impact Avoidance and Minimization Feature Analysis for each of the following resource areas/topics (as applicable to HSR project section):

   – Transportation
   – Air Quality and Global Climate Change
   – Noise and Vibration
   – Electromagnetic Fields and Electromagnetic Interference
   – Public Utilities and Energy
   – Biological Resources and Wetlands
   – Hydrology and Water Resources
   – Geology, Soils, Seismicity and Paleontological Resources
   – Hazardous Materials and Wastes
   – Safety and Security
   – Socioeconomics and Communities
   – Station Planning, Land Use, and Development
   – Agricultural Farmland and Forest Land
   – Parks, Recreation, and Open Space
   – Aesthetics and Visual Quality
   – Cultural Resources

2.12 Chapter 2—Alternatives EIR/EIS Outline

The RC shall use the following outline for organizing Chapter 2 of the project EIR/EIS, using the heading hierarchy and format as indicated.

Chapter 2 Alternatives
2.1 Introduction
2.2 Background
  2.2.1 California HSR System Background
  2.2.2 [section name] Section EIR/EIS Background
2.3 HSR System Infrastructure
  2.3.1 System Design Performance, Safety, and Security
  2.3.2 Vehicles
  2.3.3 Stations
    2.3.3.1 Station Platforms and Trackway (Station Box)
    2.3.3.2 Station Arriva/Departure Facility (Station House)
  2.3.4 Infrastructure Components
    2.3.4.1 At-Grade Profile
    2.3.4.2 Retained-Fill Profile
    2.3.4.3 Retained-Cut Profile
    2.3.4.4 Tunnel Profile
    2.3.4.5 Elevated Profile
  2.3.5 Grade Separations
  2.3.6 Traction Power Distribution
    2.3.6.1 Traction Power Substations
    2.3.6.2 Switching and Paralleling Stations
    2.3.6.3 Backup and Emergency Power Supply Sources for Stations and Facilities
  2.3.7 Signaling and Train-Control Elements
  2.3.8 Track Structure
  2.3.9 Maintenance Facilities
    2.3.8.1 Maintenance-of-Way Facilities
    2.3.8.2 HSR Heavy Maintenance Facility *[HMF for Merced-Fresno and Fresno-Bakersfield Sections only]*
    2.3.8.3 Terminal Storage and Maintenance Facility
2.4 Potential Alternatives Considered During Alternatives Screening Process
  2.4.1 HSR Project-Level Alternatives Development Process
    2.4.1.1 Project Definition Framework and Alternatives Development
    2.4.1.2 Summary of HSR Project-Level Alternatives Development Process
  2.4.2 Range of Potential Alternatives Considered and Findings
    2.4.2.1 Geographic Segments of the HSR Project Section
    2.4.2.2 Alternatives Considered and Findings
2.5 Alignment, Station, and Heavy *[only for Merced to Fresno and Fresno to Bakersfield sections]* or Terminal Storage and Maintenance Facility *[as applicable to particular HSR section]* Alternatives Evaluated in this Project EIR/EIS
  2.5.1 No Project Alternative—Planned Improvements
    2.5.1.1 Planned Land Use
    2.5.1.2 Planned Highway Improvements
    2.5.1.3 Planned Aviation Improvements
    2.5.1.4 Intercity Transit Improvements
    2.5.1.5 Freight Rail Improvements
    2.5.1.6 Planned Port Improvements

- 2.5.2 HSR Build Alternatives
  - 2.5.2.1 Overview and Summary of Design Features
    - Alignments
    - Station(s)
    - Heavy Maintenance Facility
    - Terminal Storage and Maintenance Facility
    - Safety and Security
    - State Highway or Local Roadway Modifications
    - Freight or Passenger Railroad Modifications
  - 2.5.2.2 HSR Project Impact Avoidance and Minimization Features
    - Transportation
    - Air Quality and Global Climate Change
    - Noise and Vibration
    - Electromagnetic Fields and Electromagnetic Interference
    - Public Utilities and Energy
    - Biological Resources and Wetlands
    - Hydrology and Water Resources
    - Geology, Soils, Seismicity and Paleontological Resources
    - Hazardous Materials and Wastes
    - Safety and Security
    - Socioeconomics and Communities
    - Station Planning, Land Use, and Development
    - Agricultural Farmland and Forest Land
    - Parks, Recreation, and Open Space
    - Aesthetics and Visual Quality
    - Cultural Resources
  - 2.5.2.3 Alternative 1
    - Rationale
    - Segment 1
      - Alignment and Ancillary Features
      - Station Site(s)
      - Maintenance Facility Site(s)
      - State Highway or Local Roadway Modifications
      - Freight or Passenger Railroad Modifications
      - Land Use and Community Modifications
    - Segment 2
      - Alignment and Ancillary Features
      - Station Site(s)
      - Maintenance Facility Site(s)
      - State Highway or Local Roadway Modifications
      - Freight or Passenger Railroad Modifications
      - Land Use and Community Modifications
    - Segment 3
      - Alignment and Ancillary Features
      - Station Site(s)
      - Maintenance Facility Site(s)
      - State Highway or Local Roadway Modifications
      - Freight or Passenger Railroad Modifications
      - Land Use and Community Modifications

Segment N
Alignment and Ancillary Features
Station Site(s)
Maintenance Facility Site(s)
State Highway or Local Roadway Modifications
Freight or Passenger Railroad Modifications
Land Use and Community Modifications

2.5.2.4 Alternative 2
Rationale
Segment 1
Alignment and Ancillary Features
Station Site(s)
Maintenance Facility Site(s)
State Highway or Local Roadway Modifications
Freight or Passenger Railroad Modifications
Land Use and Community Modifications
Segment 2
Alignment and Ancillary Features
Station Site(s)
Maintenance Facility Site(s)
State Highway or Local Roadway Modifications
Freight or Passenger Railroad Modifications
Land Use and Community Modifications
Segment 3
Alignment and Ancillary Features
Station Site(s)
Maintenance Facility Site(s)
State Highway or Local Roadway Modifications
Freight or Passenger Railroad Modifications
Land Use and Community Modifications
Segment N
Alignment and Ancillary Features
Station Site(s)
Maintenance Facility Site(s)
State Highway or Local Roadway Modifications
Freight or Passenger Railroad Modifications
Land Use and Community Modifications

2.5.2.5 Alternative 3
Rationale
Segment 1
Alignment and Ancillary Features
Station Site(s)
Maintenance Facility Site(s)
State Highway or Local Roadway Modifications
Freight or Passenger Railroad Modifications
Land Use and Community Modifications
Segment 2
Alignment and Ancillary Features
Station Site(s)
Maintenance Facility Site(s)
State Highway or Local Roadway Modifications
Freight or Passenger Railroad Modifications
Land Use and Community Modifications

3 AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES, AND MITIGATION MEASURES

The methodology guidelines presented in Chapter 3 describe a comprehensive process of (1) gathering relevant and sufficient data, (2) evaluating potential impacts under the California Environmental Quality Act (CEQA) (Cal. Public Res. Code, § 21000 et seq.) and the National Environmental Policy Act (NEPA) (42 U.S.C. § 4321 et seq.), and (3) designing feasible and effective measures to mitigate significant impacts—all in a manner relevant to the specific resource, clearly and efficiently presented for the reader, and fully documented for legal adequacy. This guidance provides a general framework, recognizing that some resources or topics require greater flexibility than others. If there is a discrepancy between the material in this guidance and any adopted federal and state agency guideline or manual applicable to the resources or topics analyzed by the EIR/EIS, the agency guideline or manual controls. In any case where the Regional Consultant (RC) proposes a substantial departure from this guidance, the RC must consult with the California High-Speed Rail Authority (Authority), Federal Railroad Administration (FRA), and the Program Management Team (PMT) about the appropriateness of the approach before implementation. In addition, Authority and FRA legal staff must confirm CEQA and NEPA adequacy, as well as compliance with other applicable environmental laws, before the RC implements a different methodology.

The guidelines for Chapter 3 are organized in numerical order, by section and subsection. They include general guidance applicable to all EIR/EIS resource sections (Section 3.0) and resource-specific guidance (Section 3.2 through Section 3.18). Section 3.19 provides the cumulative impact analysis methodology. Section 3.0 and Section 3.19 must be used in combination with the resource-specific guidance sections when developing the EIR/EIS analyses.

For consistency and to facilitate use of the EIR/EIS, organize the presentation of affected environment, environmental consequences, and mitigation measures by the same geographic segment configuration defined in Chapter 2, Alternatives. Present information associated with the project alternatives within each geographic segment under the subheadings of Construction Impacts and Operations Impacts. As described above, the Impact Summary is presented by end-to-end alternative, with impact summary information grouped by construction and operations. Organizing information by these two general periods of project implementation will help explain when impacts are expected to occur.

Legal Authority to Implement Offsite Mitigation

Chapter 3 analyzes the HSR project's potential physical environmental effects on various resource areas. If a potential significant effect is found, mitigation measures are proposed. Most mitigation measures identified are within the Authority's jurisdiction and control. These include physical measures to be done within the HSR project right-of-way (for example, sound barriers adjacent to the track), physical modifications to the project design itself, and construction methods and techniques (the Authority will be able to require these of its design-build contractors), among others. Similarly, mitigation that involves the Authority's contributing its fair share of the cost of future construction or services is largely within the Authority's control.

Some of the proposed mitigation measures, however, would occur on property the Authority would not own as part of its right-of-way acquisitions. These are sometimes referred to as "offsite" mitigations. Mitigation that would occur on property not owned by the Authority would require working with the property owners involved or with the jurisdiction that regulates the property in order to accomplish that mitigation. Therefore, although the Authority is committed to that mitigation, it cannot fully guarantee that it will be implemented because the final decision is outside the Authority's control.

For example, the transportation analysis (Section 3.2) identifies various traffic improvement mitigation measures along the HSR alignment. These measures include, for example, installing new traffic signals, modifying lane widths, and adding lanes and turn pockets. In most cases, the roadways and intersections on which mitigation is proposed are owned and controlled by local governments. The Authority intends to work cooperatively with local governments along the HSR alignment to confirm that the Authority can implement all traffic mitigations and improvements. A local government might, however, find undesirable a particular traffic improvement, and the Authority does not have jurisdiction to require a local government to accept such a measure. As a result, it is theoretically possible that some traffic impacts could go unmitigated or not fully mitigated (i.e., result in a significant and unavoidable impact). This result is considered unlikely, because it is anticipated that local governments would prefer traffic mitigation over traffic congestion and would work with the Authority to implement traffic mitigation. The Authority has continued to work with local governments to confirm that traffic mitigation meets the identified performance standards in Section 3.2, Transportation, and can be accomplished.

Other "offsite" mitigation measures that will require working with public and private property owners include, noise insulation at private residences or public buildings; relocation of utilities; shielding of UPRR and BNSF signaling systems; preservation, restoration, or creation of biological resources; conservation of agricultural lands through conservation easements; new plantings (for visual screening) outside the HSR project right-of-way; and relocation of historical structures. The Authority cannot force these property owners to accept mitigation measures; however, by providing funding to willing sellers in selected instances (such as for the acquisition of agricultural conservation easements or for habitat restoration), it is considered likely that the mitigation can be accomplished.

Outreach to Local Agencies

Meet with the staff of local public agencies within the HSR sections to ensure the EIR/EIS properly reflects the local, on-the-ground conditions and appropriately analyzes impacts. The following sections provide direction on the important role of local public agencies in providing existing conditions information for the EIR/EIS, as well as in identifying types of potential impacts and mitigation measures that should be considered in developing the EIR/EIS environmental analysis.

Meet with Local Public Agencies to Gather Information for the Environmental Setting/Existing Conditions

The Draft EIR/EIS will describe the environmental setting/existing conditions in the vicinity of the project as it exists at the time the notice of preparation/notice of intent is issued, or commencement of environmental analysis. Meet with local public agencies to gather facts to support the description of the environmental setting/existing conditions. The local public agency will likely be a source of documents and data to support the environmental setting/existing conditions (general plans, community plans, safety plans, school siting plans, photographs, other data, etc.). While some local public agency documents and data may be available online, this is not always the case. Take particular care to identify the most currently available documents or data that will contribute to depicting the environmental setting.

Meet with Local Public Agencies on the Range of Impact Issues to Consider

The Draft EIR/EIS will discuss the environmental impacts of the HSR project. The environmental methodologies provide a basic list of the types of impacts that should be considered. The Merced to Fresno and Fresno to Bakersfield EIR/EIS documents also illustrate the range of impacts. Local conditions may require consideration of different or additional impact areas. In conjunction with meeting on the environmental setting/existing conditions, discuss the range of impact areas with local public agencies and seek their feedback on whether there are unique local conditions that merit consideration of different or additional impact areas. The Draft EIR/EIS for each HSR

section may discuss specific impact areas that reflect the unique conditions within that section and that are not necessarily pertinent to other sections.

Meet with Local Public Agencies Regarding Mitigation Measure Options

The Draft EIR/EIS will describe feasible mitigation measures to avoid or minimize the project's significant adverse impacts. Discuss mitigation measure concepts with the appropriate local public agencies and seek feedback on types of mitigation. Such discussions should occur in advance of publication of the Draft EIR/EIS so that local public agency feedback can be reflected in the document. For example, traffic mitigation measures affecting local roadways and intersections must be coordinated with the local public works agency to ensure that the measures incorporate appropriate local engineering standards, are feasible and reasonable for the local agencies to implement, and are consistent with their long-range planning programs.

Document All Communications with Local Public Agencies

Document meetings and communications with local public agencies for the administrative record in a memo to file showing the date of the meeting or communication, the participants involved, and a brief summary of the issues discussed.

Following is a reference list of local public agency types for inclusion in the EIR/EIS process:

- City
- County
- School District*
- Resource Conservation District
- Water District
- Irrigation District
- Community Services District
- Recreation and Parks District(s)
- Police Department
- Sheriff's Office
- Fire Department
- Emergency Services Office

*See separate guidance on consultations with school districts

3.0 General Methodology Guidance for Chapter 3 Resource Sections

The methods described in this section are generally applicable and establish a framework for all resource areas. Any resource specific variations from this overall approach are addressed in the section for that resource area. The environmental methodology guidelines for each section are organized using a sequence of steps for conducting the environmental analysis and preparing EIR/EIS documentation. The EIR/EIS content is organized using the outline presented at the end of each individual resource section. The Chapter 3 methods for each EIR/EIS resource use the same formatting scheme for headings, text, and tables as the EIR/EIS document.

Guidance on identifying, assessing and discussing cumulative impacts for each resource is provided in Section 3.19, Cumulative Impacts. Conduct the cumulative impact analysis for each resource area based on this guidance and present the discussion in Section 3.19 of the EIR/EIS rather than in each individual resource section.

For guidance on baseline years for analysis, high-speed rail (HSR) system configuration and phasing, and definitions of common descriptive and analytical terms, see the *Environmental Guidance to HSR Regional Teams EIS/EIR Revised CHSR Program Implementation and Ridership Assumptions, and Project Lexicon* (June 2014). The Authority and PMT have prepared extensive technical guidance and data on HSR planning, facility design, and service operations; systems; HSR station and station area planning; maintenance; rolling stock; environmental analysis; regulatory permitting; right-of-way acquisition and other aspects of the HSR program and projects. An inventory of this guidance and data is provided in Appendix A of the Project EIR/EIS Environmental Methodology Guidelines. California High-Speed Rail Authority (Authority) and Program Management Team (PMT) guidance is continuously evolving and may not be reflected in these references. Consult with the PMT to assure use of the most recently published guidance.

If there is a discrepancy between the material in this guidance and any adopted federal and state agency guideline or manual applicable to the resources or topics analyzed by the EIR/EIS, the agency guideline or manual controls. Identify and discuss any such discrepancy with the Authority, Federal Rail Administration (FRA), and the PMT before deviating from this guidance.

3.0.1 Introduction

In the introduction subsection of each resource section, provide an overview of the resource and a summary of the crucial issues or concerns relating to the resource area, preferably in a bullet or tabular format. This subsection will also present a list of the technical documents used to support the analysis and to prepare the impacts section. Note that when the environmental document is released for public review, all technical documents (e.g., technical appendices to the EIR/EIS or technical memoranda/reports) that can be made available to the public will be posted to the Authority website (www.hsr.ca.gov).

A brief discussion of the approach to high-speed rail (HSR) implementation through the formulation of project, construction, and operation design (described comprehensively in Chapter 2, Alternatives) will be included in Section 3.1, Introduction.

List the program or project features that have been integrated into the Project Description and summarize the mechanism(s) by which the integrated features avoid or reduce impacts. The impact mechanism summary must be based upon substantial evidence, which should be documented in detail in an Appendix. The intent of these program and project elements is to demonstrate HSR objectives and policies to avoid or minimize environmental and community impacts while implementing sustainable transportation infrastructure to meet the state's needs for intercity travel. The impact analyses presented in each section in Chapter 3 reflect the assessment of the proposed project with all of the program and project measures integrated through project design and implementation (including avoidance and minimization features). Measures for mitigation are those needed to reduce significant impacts after all avoidance or

minimization measures are implemented through project construction and operation. Mitigation measures may be carried forward from, or based upon refinement of, program-level mitigation measures or newly devised project-level measures.

3.0.2 Laws, Regulations, and Orders

An illustrative list of federal and state laws, regulations, and orders applicable to each resource are described in each resource section. Determine the laws, regulations, and orders that are applicable to each resource and relevant to analysis of potential impacts associated with the HSR project section.

3.0.2.1 Regional and Local Regulatory Framework

The HSR project is an undertaking of the Authority and FRA, in their capacities as state and federal agencies, and is not required to be consistent with local plans. However, an understanding of regional and local plans, ordinances, or guidelines is important to provide a context for the project. Provide an inventory of adopted local and regional plans, ordinances, or guidelines related to the specific resource area. A tabular format similar to that used in the *Fresno to Bakersfield Section Final EIR/EIS*, or more recent HSR project EIR/EIS, may be used to organize and concisely report this information.

3.0.3 Regional and Local Policy Analysis

3.0.3.1 Background

Pursuant to CEQA Guidelines (Section 15125(d)), FRA's *Procedures for Considering Environmental Impacts* (64 Fed. Reg. 28545), and CEQ's guidance on implementing NEPA (40 C.F.R. Part 1506.2(d)), the following standard text [red text] is recommended as an introduction to this section:

State and regional policies supporting the California HSR system have been described in Section 3.1.3 of this document. Because the HSR project is an undertaking of the Authority and FRA, in their capacities as state and federal agencies, it is not required to be consistent with local plans. CEQ and FRA regulations, however, require the discussion of any inconsistency or conflict of a proposed action with regional or local plans and laws. Where inconsistencies or conflicts exist, CEQ and FRA require a description of the extent of reconciliation and the reason for proceeding if full reconciliation is not feasible (40 C.F.R. Part 1506.2(d) and 64 Fed. Reg. 28545, 14(n)(15)). CEQA Guidelines also require that an EIR discuss the inconsistencies between the proposed project and applicable general plans, specific plans, and regional plans (CEQA Guidelines Section 15125(d)).

Because the HSR project is a state and federal government project, it is not subject to local government jurisdictional issues of land use. Consequently, a city or county is not "an agency with jurisdiction over the project" as described in Appendix G of the CEQA Guidelines. Although the EIR/EIS describes the HSR project's inconsistency with local plans in order to provide a context for the project, inconsistency with such plans is therefore not considered an environmental impact. The discussion is included to provide the local planning context.

3.0.3.2 Methodology

Discuss the inconsistency of the proposed HSR project with adopted local and regional plans or policies/laws applicable to the specific resource area. Where physical changes proposed by the HSR project are inconsistent with adopted regional or local policies, describe the extent to which the Authority would reconcile its proposed action with these policies and the rationale for proceeding if full reconciliation is not feasible.

Base the inconsistency discussion on local and regional policies related to the specific resource, as described in Subsection 3.X.2.3 of the EIR/EIS resource section. Organize the discussion by policy/law, describing any inconsistencies, reconciliation, or non-reconciliation rationale by

alternative (alignment, station sites, and maintenance areas), in segments where each policy/law is applicable. For each inconsistency with an adopted policy, present a brief, substantive explanation about the extent to which the Authority would reconcile its proposed action with the affected regional or local policy or the reason for proceeding without "full reconciliation." The following outline illustrates this organization scheme. Present brief, substantive explanations of the project's policy inconsistency.

1. Policy/Law Summary—Identify specific, adopted policy or law with which the HSR project is inconsistent.
2. Applicable Segments—Identify segments within jurisdiction of policy.
3. Inconsistent Alternatives—Alternative 1-N: Describe how the alternative is inconsistent (or alternatives if inconsistency applies to several alternatives).
4. Reconciliation—Describe how the Authority will reconcile the inconsistency or measures provided in the project that reconcile the inconsistency.
5. Non-reconciliation—Where inconsistencies or conflicts exist, explain the Authority rationale for proceeding without full reconciliation.

Summarize the conclusions of HSR project inconsistencies with adopted regional or local policies/laws in a table that supports a visual comparison of the HSR Alternatives. *Table 3.0-1* provides a template for this summary table.

Table 3.0-1 Policy Inconsistency Summary Table (example only)

Policy/Law	Alternative 1	Alternative 2	Alternative 3	Alternative N
GP Policy A3	√			√
BCDC Policy LU1		√	√	
Ord. #2352, Policy X	√		√	
Etc.	√	√		√

Note: Check (√) marks indicate the alternatives that are inconsistent with the policy.

3.0.4 Methods for Evaluating Impacts

Guidance specific to each resource is provided in each resource analysis method.

3.0.4.1 Definition of Resource Study Area

The resource study area (RSA) is the area in which all environmental investigations specific to each EIR/EIS resource are conducted in order to determine the resource characteristics and potential impacts of the HSR project section. The general description of the RSA for the EIR/EIS document is provided in Section 3.1, Introduction. The RSA pertinent to each resource area is defined for each resource section in each resource analysis method.

There are two factors that determine the geographic extent and organization of the resource analysis: (1) the geographic extent of the HSR project section and (2) physical proximity to the HSR project and associated physical changes and influence of HSR operations. The RSA for cumulative impacts encompasses the area affected by the accumulation or interaction of project impacts with impacts of other actions, and may include adjacent HSR sections. Depending upon the resource type, condition and distribution, and the type, severity and affective range of impacts, the RSAs for cumulative impacts may be regional or statewide. Section 3.19, Cumulative Impacts, of this methodology provides a more detailed discussion.

HSR Project Section

Each HSR project section was determined through the Authority's decisions on the systemwide High-Speed Train Program EIR/EIS and the Bay Area to Central Valley Program EIR/EIS. If the Authority reconsiders the number and extents of HSR project sections, the rationale and factual basis for changing HSR project sections will be documented in Chapter 1, Project Purpose, Need and Objectives, of the EIR/EIS for the re-defined HSR project section.

The geographic extent of the HSR project section is described in Chapter 2, Alternatives, of the EIR/EIS. The primary area where the project is expected to cause direct impacts corresponds to the locations where most actions associated with the project will occur—the extent of the HSR project section alignment and nearby locations. Direct impacts of off-site actions (such as compensatory mitigation), region- or state-scale impacts, overlap/interactive impacts of adjacent HSR project sections, and indirect impacts may occur beyond the immediate extent of the HSR project section. When defining the RSA, consider the full range of reasonably foreseeable impacts associated with the HSR project section and interacting aspects of adjacent HSR project sections, and the types of investigations needed to completely analyze and document impacts and associated mitigation measures for each affected resource.

HSR Project Elements and Setting

The RSA contains all of these components:

- All facilities or features within the project footprint,[1] particularly stations, maintenance facilities, and consequential actions that affect the environmental resource
- Areas to determine characteristics and context relevant to the project segment
- Areas specific to each resource to evaluate the intensity and determine the significance of direct and indirect impacts, beneficial and adverse impacts of HSR improvements, and activities
- Areas needed to implement, operate, or maintain mitigation measures or off-site mitigation measures and mitigation sites (including relocations and interconnections to electrical transmission lines)
- Areas to identify and analyze potential secondary impacts of implementing mitigation

[1] *Project Footprint* is the area needed to construct, operate and maintain all permanent HSR features (including tracks and guideway structures, train signaling and controls and communications facilities, traction power distribution and substations, switching and paralleling stations, passenger platforms and stations, maintenance-of-way facilities, maintenance facilities, HSR perimeter security controls, passenger station access, HSR facility operation or maintenance access, sound walls or other peripheral features owned and maintained by the Authority), freight or passenger or transit railroad grade separations, roadway grade separations and adjoining street or intersection changes, contiguous access to severed parcels, new utility features, existing utility relocations, access to new or relocated utility features, drainage facilities, any other physical changes within the area needed to construct and operate HSR, and HSR property rights or licenses to accommodate HSR construction, operation and maintenance (temporary and permanent ground or aerial fee properties, easements or licenses for HSR facility and associated feature sites, HSR operations and maintenance activities, operation or maintenance access, utility connections and maintenance, HSR stormwater and wildlife management features, construction activities, mobilization, staging and access).

Figure 3.0-1 illustrates the RSA concept.

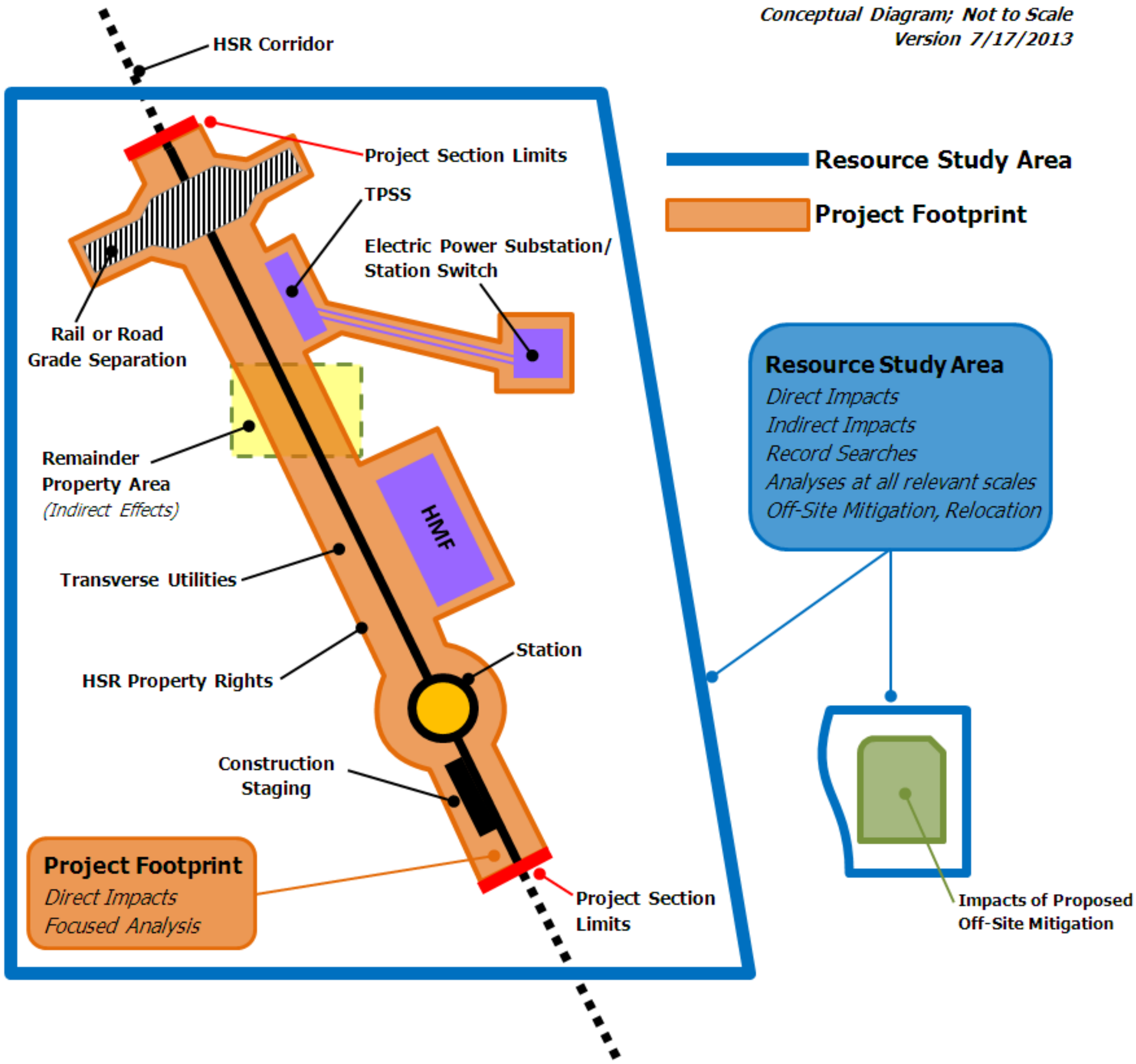


Figure 3.0-1 Resource Study Area

3.0.4.2 Methodology for Impact Analysis

This subsection will explain the research and analysis methods used to determine Environmental Consequences subsection (e.g., data collection methods and sources, inventory of regional and local conditions, evaluation of analytical context, qualitative or quantitative data analysis techniques). Determine how the activity or physical change causes an impact. Consider the context, intensity, and duration of the activity or physical change and the impact threshold(s) applicable to the resource. Include a clear and thorough description of the methodology applied to evaluate NEPA impact severity—without the use of intensity thresholds—and describe the regional or local context within which the significance of impacts is ascertained. For CEQA, describe the methodology applied to analyze project effects and the CEQA criteria for determining the significance of impacts upon the resource.

For most resource impact analyses, the HSR project construction and operations impacts resulting from completion of Phase 1 will be evaluated based on the changes that would occur to the resource conditions described as part of the affected environment. Construction and

operations impacts will be evaluated separately. The impact analyses use the HSR section horizon year that is indexed to the Regional Transportation Plan(s) applicable to the HSR section (per NEPA practice) and the most recently adopted HSR Business Plan. The current horizon year for HSR is 2035, yet will advance as RTPs and the HSR Business Plan are updated.

The substantial differences in timing and circumstances associated with HSR construction, initiation of HSR operations, interim and full HSR operations will require use of progressive baselines for the transportation, air quality/GHG, energy, noise and vibration impact analyses. This approach will capture changes resulting from planned traffic improvement projects and the different stages of HSR operation. In addition to the construction and Phase 1 impacts, these sections also will consider impacts at the date of project implementation and at interim terminus stations. Detailed descriptions of these baselines are presented in Sections 3.2, 3.3, 3.4, and 3.6. Baseline timeframe(s) must support meaningful description and assessment of effects, and will be confirmed through consultation with the Authority, FRA, and PMT.

3.0.4.3 Method for Determining Significance under NEPA

NEPA does not provide a definitive threshold to determine significant or potentially significant impacts. For this reason, use professional judgment when determining whether an impact is significant or less than significant. For the purposes of HSR project EIR/EIS documents, the evaluation of NEPA impact significance does not use intensity gradations. The Council on Environmental Quality (CEQ) NEPA regulations (40 C.F.R. Parts 1500-1508) provide the basis for evaluating project effects. As described in Section 1508.27 of these regulations, the criteria of context and intensity, and implementation of mitigation measures are considered together when determining whether an impact is significant under NEPA. Context refers to the affected environment in which a proposed project occurs. Intensity refers to the severity of the impact, which is examined in terms of the type, quality, and sensitivity of the resource involved, location and extent of the effect, duration of the effect (short- or long-term), and other considerations set forth in the CEQ regulation. For example, construction activities that would severely disturb large areas of unsurveyed habitat having the potential to support special-status species would be a significant impact. Identify and describe both adverse and beneficial effects. When there is no measurable effect, the impact is found not to occur.

3.0.4.4 Method for Determining Significance under CEQA

Determine the significance of impacts under CEQA for each resource on the basis of thresholds of significance in the CEQA Guidelines and other applicable guidance. See the methods for each resource for specific direction and thresholds. For criteria of significance for indirect impacts to each resource, see the methods for corresponding resource sections.

3.0.5 Affected Environment

CEQA requires the description of the physical environmental conditions in the vicinity of the project that exist at the time the Notice of EIR/EIS Preparation for the HSR section is issued or at commencement of the environmental analysis. Those conditions, in turn, *will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant* (CEQA Guidelines Section 15125(a)). NEPA requires a succinct description of the environment of the area(s) to be affected by the alternatives under consideration. The descriptions shall be no longer than is necessary to understand the effects of the alternatives. Data and analyses shall be commensurate with the importance of the impact, with less-important material summarized, consolidated, or simply referenced (40 C.F.R. Part 1502.15).

Describe the existing conditions relevant to the RSA being evaluated. For example, the air quality section should describe the air basins at a regional level and the specific locations that could be subjected to localized air quality impacts. Identify sensitive or protected resources that could be impacted by the HSR project and the associated physical changes. Focus the affected environment discussion on data and issues that may influence potential effects and

environmental commitments. When appropriate, draw a distinction between the affected environments for alternatives that encompass different areas of impact. Organize the EIR/EIS presentation of this subsection by the geographic segments defined in Chapter 2, Alternatives, of the HSR project section EIR/EIS.

3.0.6 Environmental Consequences

Organize discussion by the HSR geographic segment configuration defined in Chapter 2, Alternatives. Within each segment, present the impacts by alternative and group by construction impacts or operations impacts. Construction impacts are those resulting from building the project, its associated infrastructure, and related physical changes. Operations impacts result from ongoing, routine, and occasional activities associated with the delivery of HSR and related services (e.g., operating HSR transit services and maintaining associated equipment and facilities of the HSR system). Presenting the impacts under the subheadings of construction impacts and operations impacts will help explain when impacts are expected to occur. Number each impact and each mitigation measure to help the reader connect the appropriate mitigation to the primary significant impact (however, specific reference must be made where impacts are mitigated by measures that are proposed primarily for another significant impact). The heading structure for this organizational scheme is shown in each resource section, along with numbering conventions. The text and subheading should make clear that the impacts assessment in this subsection describes the impacts of the project with incorporation of avoidance and minimization features or other refinements consistent with the statewide and Bay Area to Central Valley Program EIR/EIS commitments (as appropriate to the geographic location of the HSR project segment), but before consideration of project mitigation measures. Use these terms to differentiate duration of impacts during construction and operation:

- Construction impacts that occur for a limited time only are considered ***temporary*** (e.g., short-term ground disturbance, construction staging and activities, construction associated with implementing mitigation measures).[2]
- Construction impacts that continue long-term are ***permanent*** (e.g., land conversion, removal of habitat, elimination of at-grade crossings, construction of permanent structures).
- Operations impacts that occur during incremental stages of HSR implementation that would change with build-out of the HSR program are ***interim*** (e.g., stations that are temporary HSR system termini that convert to line stations following the completion of subsequent HSR stages).
- Operations impacts that are not continuous but recur during operation of the system on an episodic or occasional basis throughout the life of the system are ***intermittent*** (e.g., traction power infrastructure maintenance, cyclical maintenance of way).
- Operations impacts that are continuous throughout the life of the system are ***permanent*** (e.g., HSR land use development, facility appearance, traffic associated with HSR stations, train operations, mitigation maintenance).

The NEPA and CEQA assessments shall reach specific, separate conclusions about significance for each impact based on the significance criteria and methods defined in more detail in the specific resource methodologies. The explanation of NEPA impact significance must include the context, intensity, and duration of the impact and applicable threshold(s), as well as implementation of mitigation measures. The discussion of each impact's duration shall be part of the narrative, along with other impact characteristics, as appropriate (e.g., direct, indirect, adverse, or beneficial).

[2] NEPA Guidelines specifically state that, "Significance cannot be avoided by terming an action temporary…" 40 C.F.R. 1508.27(b)(7).

Clearly explain the nexus between the threshold, the impact, and each applicable mitigation measure and include supporting documentation either in the EIR/EIS or by citing another supporting document. Explanations for less-than-significant impacts after mitigation must cite specific facts and reasons. Where the conclusion of significance after mitigation is based upon uncertain reasoning, either (1) add additional information to support a definitive conclusion or, if additional information sufficient to resolve uncertainty cannot be obtained, then (2) state that the conclusion that the impact is significant and unavoidable, due to insufficient information to determine a less-than-significant outcome.

If the feasibility of the mitigation is questionable, then the conclusion would be significant and unavoidable. Anticipating the preparation of Findings of Facts and a Statement of Overriding Considerations, support all impact conclusions with data, analysis, and facts in the record.

Group or consolidate information and discussion in the EIR/EIS to effectively present content to the lay audience (i.e., by distinct resource characteristic or component, such as types of land uses, sensitive biological resources, cultural resources). Conflict with applicable plans and policies is not considered an environmental impact for the purposes of determining significance under CEQA, yet provides the context for determining significance under NEPA. Consider project actions that improve or otherwise benefit a resource in the evaluation of impact significance.

3.0.7 Mitigation Measures

Identify mitigation measures to avoid or reduce significant impacts that exist after application of all impact avoidance or minimization features through project construction and operation. Implementation of impact avoidance and minimization features will be tracked by the Mitigation Monitoring and Enforcement Plan. Provide an introductory paragraph that concisely describes the mitigation measures for the resource. Refer to the resource-specific Chapter 3 subsection in the *Fresno to Bakersfield Section Final EIR/EIS*, or more recent HSR project EIR/EIS, as an example. Assign a brief descriptive title and a number to each mitigation measure that corresponds to the short descriptive title and number assigned to the primary resource impact(s) to assist tracking. Describe mitigation measures that are specific to the resource subsection and include code and title references to measures specific to other resources that provide mitigation benefits to the subsection resources. Organize the presentation of mitigation measures by the HSR geographic segment configuration defined in Chapter 2, Alternatives. Present the mitigation measures associated with the project alternatives within each geographic segment under the subheadings of Construction Measures and Operations Measures. The detailed heading structure for this organizational scheme is shown in each resource method.

Develop project-level measures that are consistent with adopted program and project strategies that avoid or minimize impacts. Begin by considering programmatic mitigation strategies described in the following documents, as applicable to the HSR project section:

- For NEPA mitigation measures—the *Bay Area to Central Valley HST Final Program EIR/EIS and Record of Decision* (2008, www.hsr.ca.gov/Programs/Environmental_Planning/bay_area_2008.html)
- For CEQA mitigation measures—the *Bay Area to Central Valley HST Partially Revised Program Final EIR and CEQA Findings* (2012, www.hsr.ca.gov/Programs/Environmental_Planning/bay_area.html)
- The resource-related technical reports and environmental document sections in the most recent environmental documents produced by the Authority (e.g., *Fresno to Bakersfield Section Final EIS/EIR*, or more recent HSR project EIR/EIS)
- CEQA findings of fact and the records of decision for previously adopted project-level high-speed rail project documents

Taking into account the programmatic commitments at the beginning of the environmental document process should not preclude the continuing comprehensive process of designing project-level mitigation. Where applicable to the circumstances and impacts of a particular HSR project section, general mitigation strategies must be refined into project-level mitigation measures that are coupled to section-specific impacts. Previously approved project-level mitigation measures provide another starting base for design of section-specific mitigation measures, yet must also be coupled to section-specific impacts and refined accordingly.

Identify specific mitigation measures for each significant environmental impact. If mitigation measures cannot be formulated with precision (i.e., the precise measure(s), precise location, and precise features), then identify performance standards. Include quantitative, qualitative, and locational criteria, at a minimum, to ensure the mitigation measures can be implemented and reduce the significant impact. Deferred mitigation measures are only acceptable where there are measureable performance criteria, there is a specified time or action trigger for performance, and the Authority commits to implement them. In the instance where mitigation measures would be implemented by another entity, such as a local jurisdiction or other agency that is not within the purview of the Authority, implementation cannot be guaranteed and the impact would therefore remain significant and unavoidable.

Mitigation measures must:

- Be site-specific
- Describe the feasibility of implementation (e.g., would another governmental agency have to take action to carry the measure out?)
- Specify the timing of implementation and monitoring throughout the project process (e.g., prior to construction or operation)
- Detail the mechanism or means for reducing the significance of impacts
- Provide substantial evidence that the mitigation measure effectively reduces or minimizes the particular aspect(s) of the impact that causes it to be significant
- Analyze the effectiveness of identified mitigation to determine the significance of residual impacts after mitigation. The explanation of impact avoidance or attenuation must be based upon substantial evidence in the EIR/EIS or associated appendices/volumes
- Identify responsibility and timing for implementation, as appropriate, to facilitate transition into the Mitigation Monitoring Reporting Program/Mitigation Monitoring Environmental Program.

3.0.8 Impacts from Implementing Mitigation Measures

The implementation of mitigation measures is one of the "actions" associated with the project. Evaluating the impacts of mitigation measures is explicitly required under CEQA and one of the secondary impacts considered under NEPA. Under CEQA, should a mitigation measure cause significant effects in addition to those that would be caused by the project, the effects of the mitigation measure shall be discussed but in less detail than the significant effects of the project [CEQA Guidelines Section 15126.4(a)(1)(D)]. Under NEPA, the term "secondary impacts" refers to effects that are *caused by an action and are later in time or farther removed in distance but are still reasonably foreseeable* (40 C.F.R. Part 1508.8). Mitigation measures can cause secondary impacts that need to be evaluated in the NEPA document.

Evaluate all mitigation measures, including off-site measures, using the relevant methods for each resource section. Determine probable impacts using actual, on-the-ground analysis and describe the substantial basis for analytical conclusions (including defined thresholds or other criteria). When the impacts of mitigation measures cannot be quantified (e.g., at a specific location, to a definitive or measureable level, or at a particular time or duration), evaluate

potential impacts using clearly described assumptions based upon reasonably foreseeable outcomes.

Mitigation measures can cause both positive and negative impacts that must be disclosed and considered as part of the environmental analysis. Give particular attention to discussing impacts upon sensitive resources, with complete assessment of mitigation after considering both adverse and beneficial effects. If the applicable thresholds of significance indicate the secondary impacts are significant, identify mitigation measures and evaluate their effectiveness in reducing or avoiding the significant secondary impacts.

Present the analysis of potential impacts and the conclusions of impact significance for each mitigation measure immediately after describing the effectiveness, feasibility, agency, and timing of implementing the mitigation measure. For brevity, the EIR/EIS subsection can provide a summary explanation where the details of analyses and conclusions are documented in a technical appendix in Volume 2 (covering all potential impacts from implementing mitigation measures).

3.0.9 Impacts Summary

3.0.9.1 NEPA Impacts

Give a general overview of the NEPA impacts and how the different alternatives vary in their level of impact. Discuss the application of mitigation measures to the impacts and significance of impacts during construction and operations periods, and at different implementation phases, as applicable. This subsection must facilitate drafting of the summary of potential effects in the Record of Decision. It should contain a high-level summary of NEPA impacts and conclusions. The NEPA impact summary discussion and conclusion take mitigation measures into account and identify only those impacts that remain significant after mitigation (i.e., there is no need to state the conclusion where an impact is not significant).

Present the NEPA impacts, mitigation, and conclusions associated with the project alternatives by rows in a table, organized by end-to-end alternative, grouping impacts by construction and operations. *Table 3.0-2* illustrates a format that can be used to present the NEPA conclusions. Use maps, as appropriate, to show locations of significant impacts of alternatives by segment.

Table 3.0-2 NEPA Impacts for [insert resource area] (example only)

Alternative 1

Impact	Mitigations	Significance after Mitigation	Additional Measures
Construction			
Resource Impact #1: Describe the impact and the mitigation measure identified to reduce the impact.	Describe how the mitigation measure reduces the impact.	Describe why it is still significant after mitigation.	Identify any additional measures undertaken to further reduce impact or why no additional measures are available.
Operation			
Resource Impact #2			

3.0.9.2 CEQA Significance Conclusions

Give a general overview of the CEQA impacts and how the different alternatives vary in their level of impact. Discuss the application of mitigation measures to the impacts and significance of impacts during construction and operations periods, and at different implementation phases, as applicable. This subsection must facilitate drafting of the CEQA Findings of Fact and should therefore contain a high-level summary of CEQA impacts and conclusions. Present CEQA impacts by rows in a table for each end-to-end project alternative, grouping impacts by construction and operations, using three columns identifying the level of significance before mitigation, the mitigation measures, and the level of significance after mitigation. Number each impact and mitigation measure (e.g., *AQ#1* and *AQ-MM #1*). Present the CEQA conclusion narrative associated with the project alternatives under the subheadings of construction impacts and operations impacts. Use maps, as appropriate, to show locations of impacts remaining significant after mitigation by segment.

Table 3.0-3 illustrates a format that can be used to present the CEQA conclusions.

Table 3.0-3 CEQA Significance Conclusions for [insert resource area] (example only)

Alternative 1

Impact	CEQA Level of Significance before Mitigation	Mitigation Measure	CEQA Level of Significance after Mitigation
Construction			
Resource Impact #1: (describe the impact in several sentences, including where, when, specific actions/resources affected, and resulting effect.)			
Operation			
Resource Impact #2: (describe the impact per above direction)			

3.0.10 Organization of EIR/EIS Chapter 3 Resource Sections

Use the following outline to organize the Chapter 3 resource sections:

Chapter 3 Affected Environment, Environmental Consequences, and Mitigation Measures
3.1 Introduction
- 3.1.1 Chapter 3 Purpose and Content
- 3.1.2 Organization of this Chapter
- 3.1.3 State and Regional Policy Context
- 3.1.4 Approach to the Analysis
- 3.1.5 Outreach to Local Agencies
- 3.1.6 Legal Authority to Implement Offsite Mitigation

3.2 Transportation
3.3 Air Quality and Global Climate Change
3.4 Noise and Vibration
3.5 Electromagnetic Fields and Electromagnetic Interference
3.6 Public Utilities and Energy
3.7 Biological Resources and Wetlands
3.8 Hydrology and Water Resources

3.9 Geology, Soils, Seismicity and Paleontological Resources
3.10 Hazardous Materials and Wastes
3.11 Safety and Security
3.12 Socioeconomics and Communities
3.13 Station Planning, Land Use, and Development
3.14 Agricultural Farmland and Forest Land
3.15 Parks, Recreation, and Open Space
3.16 Aesthetics and Visual Quality
3.17 Cultural Resources
3.18 Regional Growth
3.19 Cumulative Impacts

3.1 Introduction

3.1.1 Federal and State Regulatory Context

Present a brief discussion of the approach to HSR implementation through formulation of project, construction, and operation design (described comprehensively in Chapter 2, Alternatives). Refer to the Chapter 2 description of alternatives and summarize the design development rationale that integrates impact avoidance or mitigation strategies from the Program EIR/EIS documents, best management practices (BMP), regulatory requirements, industry standards and program-wide features, and project-specific refinements of design, construction, and operation features in response to evaluations of resource constraints and impact avoidance. Note in this summary that the California High-Speed Rail Authority's (Authority) program-level commitments are contained in the April 19, 2012, CEQA findings for the *Partially Revised Final Program EIR* and the *Mitigation Monitoring and Reporting Program* (MMRP) from the same day; also note that the Federal Railroad Administration's (FRA) program-level commitments are contained in the December 2, 2008, Record of Decision (ROD) for the *Bay Area to Central Valley High-Speed Train (HST) Final Program Environmental Impact Report/Environmental Impact Statement* (EIR/EIS). Refer to the separate resource sections in Chapter 3 for discussion of program measures and project features pertaining to particular resource or impact topics.

The impacts presented in Chapter 3 reflect the assessment of all program and project features integrated through project design and implementation. Mitigation measures are those needed to reduce significant impacts after all avoidance or minimization features are implemented through project construction and operation. Mitigation measures may be carried forward from, or be based upon refinement of, program-level mitigation measures or newly devised project-level measures.

If the California HSR Section is required to circulate a revised or supplemental EIR/EIS, then briefly describe the background for this action. Below is an example for such text based on the *Fresno to Bakersfield Section Final EIR/EIS* (2014).

> *As discussed in Chapter 2.0, Alternatives, after public circulation of the Draft EIR/EIS for the Fresno to Bakersfield Section, the Authority decided to reintroduce an alignment west of Hanford consistent with the preferred alternative identified in the Statewide Program EIR/EIS. The Authority also decided to add another alternative through the Bakersfield area (the Bakersfield Hybrid Alternative). After evaluating the proposed addition of the Hanford West Bypass Alternatives, the Bakersfield Hybrid Alternative, and refinements being considered for existing Fresno to Bakersfield alternatives, the Authority and FRA determined that these changes made it necessary to prepare a revised Draft EIR and a supplement to the Draft EIS. Information on the affected environment, environmental consequences, and mitigation measures resulting from changes in project alternatives, as well as information and analysis provided in response to public and agency comments on the Draft EIR/EIS for the Fresno to Bakersfield Section are provided in this chapter and highlighted in gray.*

The following is "boilerplate" (red text) based on the Fresno to Bakersfield document that can be adapted for Section 3.1.

This chapter addresses existing environmental conditions and the project's potential impacts on environmental resources, examining each resource in a separate subsection. FRA is preparing an EIS for the [section name] Section of the HSR project under NEPA and the Authority is preparing an EIR under CEQA. The CEQA Guidelines encourage the preparation of joint NEPA-CEQA documents and the use of an EIS to satisfy CEQA requirements, where possible and appropriate.

FRA and the Authority have used their best judgment in preparing this combined EIR/EIS to satisfy both NEPA and CEQA requirements.

NEPA requires federal agencies to consider the potential environmental impacts (both adverse and beneficial) in the evaluation of any proposed federal agency action. NEPA also obligates federal agencies to consider the environmental consequences and costs in their projects and programs as part of the planning process. FRA carries out its obligations under NEPA through compliance with CEQ regulations (40 C.F.R. Parts 1500 to 1508) implementing NEPA and *FRA's Procedures for Considering Environmental Impacts* (64 Fed. Reg. 28545).

CEQA (PRC 21000 et seq.) and the CEQA Guidelines (14 Cal. Code Regs. 15000 et seq.) require state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, when feasible. PRC 21100(b)(3) provides that an EIR shall include a statement setting forth the mitigation measures proposed to minimize the significant effects on the environment.

The requirements of NEPA and CEQA are not necessarily the same; similar requirements found in both statutes may have different performance criteria, and some requirements that appear in one statute may not appear in the other. In addition to CEQA and NEPA, the proposed project is subject to additional federal and state environmental statutes and regulations, which also require analyses that must be incorporated into the EIR/EIS. In circumstances where more than one regulation or statute might apply, this joint EIR/EIS has been prepared in compliance with the more stringent or inclusive set of requirements, whether federal or state.

The Authority and FRA have focused on avoiding and minimizing potential impacts through rigorous planning and thoughtful design, informed by the decisions they made at the conclusion of the first-tier EIR/EIS process, including the adopted mitigation strategies. The alternatives described in Chapter 2 and analyzed in Chapter 3 incorporate as part of their description means to avoid and minimize impacts through design, compliance with applicable laws and regulations, and compliance with established industry standards, as reflected in Appendix 2-D. The project-level environmental analysis conducted for this EIR/EIS and described in this chapter includes consideration of means to avoid, minimize, and mitigate potential adverse environmental impacts. In balance with other considerations, the Authority has defined alignments along existing transportation corridors and rights-of-way to the extent feasible, while accommodating the appropriate features and design standards for the [section name] Section of the HSR project, to minimize overall impact potential. When necessary, this chapter identifies site-specific mitigation strategies for the HSR project, including those specific to each alternative alignment, proposed stations, and the other facilities, such as the power conveyance and maintenance facilities.

3.1.2 State and Regional Policy Context

The HSR system is an integral part of state and regional policy to improve mobility between the major metropolitan areas of the state and reduce statewide greenhouse gas (GHG) emissions. The transportation sector—predominantly the cars, airplanes, and trucks that move people and goods—is the largest contributor to the state's total GHG emissions, contributing 38 percent to the state total from 2002 through 2004 (California Air Resources Board 2008). The HSR system will provide direct reduction in GHG emissions by moving many people from travel in personal vehicles and airplanes to a more energy-efficient mode of transportation. The HSR system will also indirectly promote a reduction in GHG emissions by providing opportunities for low-impact, transit-oriented development around HSR stations in major metropolitan areas.

California Assembly Bill (AB) 32 (Nunez, Chapter 488, Statutes of 2006) was signed into law on September 27, 2006, requiring a reduction in GHG emissions to 1990 levels by 2020. In accordance with the law, the California Air Resources Board (CARB) developed a Scoping Plan in 2008 outlining a strategy to achieve the 2020 GHG limit that included implementing the statewide HSR system. According to the Scoping Plan (CARB 2008), the system would displace between 86

and 117 million riders from other travel modes by 2035. Over the long-term, the system also has the potential to support the reduction of GHG emissions in the transportation sector through sustainable land use strategies, by providing opportunities for and encouraging low-impact, transit-oriented development (CARB 2008).

In 2008, the California legislature passed Senate Bill (SB) 375, building on AB 32 and the "regional blueprint plan" developed in the Sacramento region by requiring regional transportation agencies to develop a "sustainable communities strategy" to reduce GHG emissions from auto trips. The Sustainable Communities Strategy (SCS) is now a component of each regional transportation plan (RTP) in the state and a requirement of all local general plans. When fully built, the 800-mile-long HSR system will cross through 17 of California's 58 counties. The Sacramento County, San Francisco Bay Area, and Southern California Metropolitan Planning Organizations (MPO) for the majority of these counties have developed SCSs and incorporated the HSR system into their RTPs as one of the methods for combining transportation resources with realistic land use patterns to achieve the state's target for reducing GHG emissions (Sacramento Area Council of Governments in 2012, Metropolitan Transportation Commission in 2013, Southern California Association of Governments in 2012, and San Diego Association of Governments in 2011).

South of Sacramento County, the eight counties of the San Joaquin Valley (San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and Kern) that would be crossed by the HSR system have individual MPOs. Each of these counties has a council of governments responsible for transportation planning, except for Madera County whose MPO is the Madera County Transportation Commission. The eight counties are coordinating on some aspects of the SCS planning effort to maximize planning resources. However, each MPO is developing a separate plan expected to be completed in 2014. The current RTPs for the eight counties were last published in 2011. Those RTPs refer to the HSR system, but no planning had yet been done to integrate the HSR into long-term county transportation planning.

In January 2006, the eight councils of government jointly received a grant from the California Business, Transportation, and Housing Agency and the San Joaquin Valley Air Pollution Control District to develop a long-term blueprint for growth in the San Joaquin Valley. On April 1, 2009, the San Joaquin Valley Regional Policy Council reviewed the collaborative work of the eight county MPOs on the San Joaquin Valley Blueprint and adopted (Council of Fresno County Governments 2009) the following:

- A list of smart growth principles to be used as the basis of blueprint planning in the San Joaquin Valley
- A preferred blueprint growth scenario (Scenario B+) for the San Joaquin Valley to the year 2050 to provide guidance for local jurisdictions with land use authority as they update their general plans

Transportation is the key factor that will shape urban and rural development in the San Joaquin Valley. Providing a variety of transportation choices is one of the smart growth principles adopted by the Policy Council. As part of this smart growth principle, the blueprint envisions HSR service in the San Joaquin Valley, with stations in Stockton, Modesto, Merced, Fresno, the Kings/Tulare region, and Bakersfield. The blueprint is expected to be implemented through collaborative local and regional programs and planning processes and through projects built by private-sector developers (San Joaquin Valley Regional Policy Council 2010).

While the HSR system is intended and designed to implement state, regional and local policies and laws related to transportation, GHG emissions, and sustainable communities, this HSR project may not be consistent with some presently adopted regional or local policies or laws. Pursuant to CEQA Guidelines (Section 15125 (d)), FRA's Procedures for Considering Environmental Impacts (64 Fed. Reg. 28555, item 15) and CEQ's regulations implementing NEPA (40 C.F.R. Part 1506.2(d)), each section in this chapter identifies inconsistency or conflict between

the proposed project and adopted regional or local plans or laws pertaining to particular resources. These discussions also describe efforts to reconcile inconsistencies or conflicts and explain the reason for proceeding if full reconciliation is not feasible.

3.1.3 Chapter 3 Purpose

This chapter describes the five primary categories of environmental information:

- Regional and Local Policy Analysis—Discussion of HSR project inconsistency with adopted regional and local polices and laws
- Affected Environment—Existing environmental conditions in the areas that would be affected by the proposed [section name] Section of the HSR project
- Methods for Evaluating Impacts—Methods used to analyze potential environmental impacts that would be caused by HSR project alternatives and to determine the significance of those impacts
- Environmental Consequences—Potential environmental impacts associated with constructing and operating the HSR alternatives
- Mitigation Measures—Site-specific mitigation measures where impacts cannot be otherwise avoided or reduced through design, BMPs during construction, or HSR operation

The analyses address the impacts of the alternative alignments, stations, and other related HSR facilities as described in Chapter 2, Alternatives, and identify key differences among the impacts associated with the different project alternatives. The analyses also evaluate impacts associated with related infrastructure changes required to accommodate the HSR alternatives, such as roadway and interchange modifications, utility relocation, and addition of power substations, and identify key differences among the impacts associated with the alternatives. This document analyzes mitigation, impacts resulting from mitigation, and feasibility of mitigation.

Analysts used many sources to prepare this document. Chapter 12, References/Sources Used in Document Preparation, lists these sources.

More About Schools

Analysis of schools in the project vicinity can be found in the following sections:

- 3.2, Transportation
- 3.3, Air Quality and Global Climate Change
- 3.4, Noise and Vibration
- 3.5, Electromagnetic Fields and Electromagnetic Interference
- 3.8, Hydrology and Water Resources
- 3.10, Hazardous Materials and Wastes
- 3.11, Safety and Security
- 3.12, Socioeconomics and Communities
- 3.13, Station Planning, Land Use, and Development
- 3.15, Parks, Recreation, and Open Space
- 5.0, Environmental Justice

3.1.4 Chapter 3 Organization

Chapter 3 presents each environmental resource topic in its own section, as follows:

- Section 3.2, Transportation*
- Section 3.3, Air Quality and Global Climate Change*
- Section 3.4, Noise and Vibration*
- Section 3.5, Electromagnetic Fields and Electromagnetic Interference
- Section 3.6, Public Utilities and Energy
- Section 3.7, Biological Resources and Wetlands*
- Section 3.8, Hydrology and Water Resources*

- Section 3.9, Geology, Soils, Seismicity, and Paleontological Resources*
- Section 3.10, Hazardous Materials and Wastes*
- Section 3.11, Safety and Security
- Section 3.12, Socioeconomics and Communities*
- Section 3.13, Station Planning, Land Use, and Development
- Section 3.14, Agricultural Farmland and Forest Land
- Section 3.15, Parks, Recreation, and Open Space
- Section 3.16, Aesthetics and Visual Quality*
- Section 3.17, Cultural Resources*
- Section 3.18, Regional Growth
- Section 3.19, Cumulative Impacts

The sections with an asterisk (*) are supported by a technical report containing additional detailed analyses.

3.1.5 Chapter 3 Content

Section 3.1 provides a summary of the type of information contained in the sections for each resource and generally describes the approach to the impact analysis.

Briefly describe the organizational scheme that will be used in all Chapter 3 sections. To allow the reader to readily compare location-based information of the alternatives for a given geographic area, organize the affected environment, environmental consequences, and mitigation measures using the same geographic segments that are defined in Chapter 2 of the EIS/EIR. Organize the NEPA Impact Summary and CEQA Significance Conclusions by end-to-end alternatives to enable the reader to readily compare alternatives. This combination of segment-based and alternative-based organization will help the public to quickly identify impacts in locations of interest, support agencies working with stakeholders on specific issues related to their jurisdictions, and encourage comparison of alternatives within the framework established by the Alternatives Analysis process.

The following is "boilerplate" (red text) based on the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014) that can be used for Section 3.1.

Each resource topic addressed in Chapter 3 includes the following sections:

3.1.5.1 Introduction

The introduction presents the reader with an overview to the topic and the critical issues and concerns considered in the analysis.

3.1.5.2 Laws, Regulations, and Orders

The laws, regulations, and orders discussion identifies the relevant regulatory framework, including topical CEQA and NEPA guidance, as well as other regulatory agency guidelines relevant to project approvals or decisions for the resource topic.

3.1.5.3 Regional and Local Policy Analysis

This section describes inconsistencies or conflicts between the HSR project and adopted regional or local plans or laws pertaining to the resource topic. The extent of reconciliation and reason for proceeding without full reconciliation are also discussed.

3.1.5.4 Methods for Evaluating Impacts

This section describes the methods used to collect data and evaluate potential impacts. This includes the following:

Study Area for Analysis

The resource study area (RSA) is the area in which all environmental investigations specific to each EIR/EIS resource are conducted in order to determine the resource characteristics and potential impacts of the Project Segment. The RSA contains all of these components:

- All facilities or features within the project footprint, particularly stations, maintenance facilities, and consequential actions that affect the environmental resource
- Areas necessary to determine characteristics and context for a specific resource area within a project segment
- Areas specific to each resource to evaluate the intensity and determine the significance of direct and indirect impacts, beneficial and adverse impacts of HSR improvements and activities
- Areas needed to implement, operate, or maintain mitigation measures
- Off-site mitigation measures and mitigation sites (including relocations)
- Areas to identify and analyze potential secondary impacts of implementing mitigation

Figure 3.1-1 illustrates the components of the RSA.

The project footprint is a more focused area that includes all project components and right-of-way needed to construct and operate the HSR project. The project footprint components include the proposed HSR right-of-way and associated facilities, such as traction-power substations and switching and paralleling stations, as well as the shifts in roadway rights-of-way associated with those facilities—including overcrossings and interchanges—that would be modified or shifted to accommodate the HSR project, as described in Chapter 2, Alternatives. The project footprint area of permanent effect would include the following:

- HSR Right-of-Way—The typical minimum right-of-way for HSR implementation would be 130 feet. This dimension may be expanded in rural areas to accommodate wildlife crossings and in mountainous areas to accommodate the topography or reduced to 80 feet in constrained urban areas.
- HSR Guideway—HSR will travel on different track types with varying profiles: low, near-the-ground tracks are at-grade; higher tracks are elevated or on retained fill (earth); and below-grade tracks are in a retained cut or tunnel. Types of bridges that might be built include full channel spans, large box culverts, or, for some wider river crossings, limited piers within the ordinary high-water channel.
- Grade Separations—A safely operating HSR system consists of a fully grade-separated and access-controlled guideway. Grade separations may occur in several scenarios: roadway overcrossings or undercrossings, and elevated HSR road crossings.

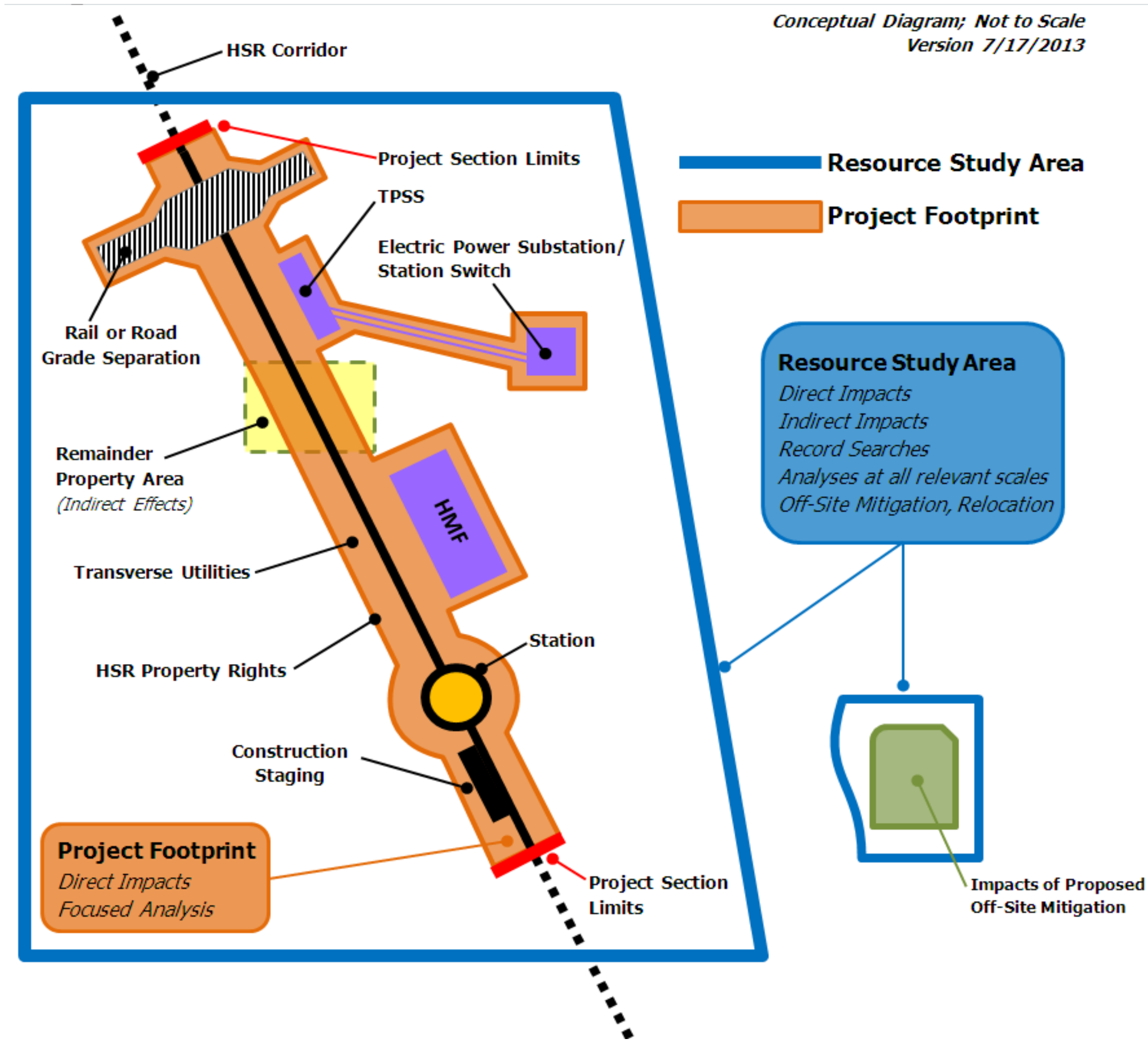


Figure 3.1-1 Resource Study Area (example only)

What Is the Project Footprint?

Text for this illustration must explicitly describe the northern and southern study area boundaries and a general description of the east-west corridor alignment. Also identify the specific areas of each county that the HSR Section crosses (e.g., northeastern Kings County). Refer to the *Fresno to Bakersfield Section Final EIR/EIS* for an example description.

- Traction-Power Substations—Each would require a 30,000-square-foot (or 200-foot by 150-foot) site adjacent to the HSR alignment.
- Switching and Paralleling Stations—Each switching station would need a site of approximately 9,600 square feet (generally 120 by 80 feet), and each paralleling station would need a site of approximately 8,000 square feet (generally 100 by 80 feet) adjacent to the proposed HSR.
- Communications Facilities—Most communications equipment and 100-foot-tall radio towers will be co-located with traction power, tunnel portal, and train control facilities. Standalone communications facilities will be placed where spacing between the co-location sites exceeds 3 miles.
- Utility Connections—The right-of-way required for new power transmission lines to provide a utility connection between electrical power substations and station switching facilities shall be included in the project footprint.
- Utility Relocations—The construction of the HSR may require the relocation of existing utility lines. The additional right-of-way required to accommodate these relocations shall be included in the project footprint.
- HSR Stations—The stations and associated structures, including parking, are analyzed as city blocks.
- Maintenance Facilities—The California HSR System includes three types of maintenance facilities: maintenance-of-way facilities; overnight layover and servicing facilities; and a single heavy maintenance facility. Each section would have maintenance-of-way facilities, and a number of overnight layover and servicing facilities would be distributed throughout the system. The HSR system would have a single heavy maintenance facility at a location within the Merced-Fresno and Fresno-Bakersfield Sections only. Maintenance-of-way facilities would be centrally located in approximately 150-mile subdivisions of the HSR system. The facility would sit on a linear site adjacent to the HSR tracks with a maximum width of two tracks and would be approximately 0.75 mile long for a total size of 26 acres. Terminal storage and maintenance facilities would be located at terminal stations, whose locations will evolve with development of the HSR system. The heavy maintenance facility may be up to 154 acres and generally 10,560 feet long by 3,000 feet wide at the widest portion. Two access tracks would diverge from the through tracks (four tracks total) on either side of the HMF, requiring a 160-foot HSR right-of-way along the access tracks.
- Project Roadway Modifications—These changes would have varying right-of-way and distance from the HSR right-of-way, as illustrated in Figure 3.1-2, and would include new roadway overcrossings over the HSR right-of-way.

The HSR project would require acquisition of property necessary for project operation. When the remnant portion of an acquired parcel beyond the right-of-way is too small to sustain current use without other modifications, it would also be acquired. These remnant parcels would not be used for construction and would be sold after project construction. The HMF sites and other identified sites along the alignment would be considered for construction staging.

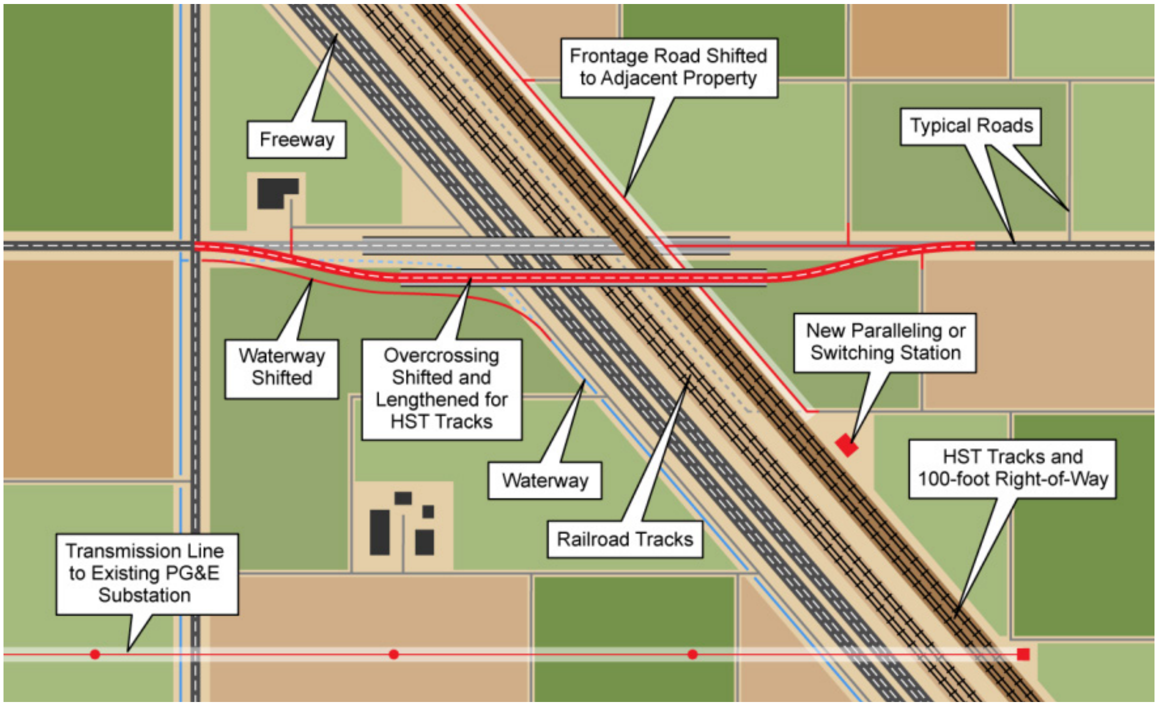


Figure 3.1-2 Shifts of Roadways and Other Infrastructure

Method for Determining Significance under NEPA

Regulations implementing NEPA require the analysis of potential impacts in terms of the project's context, intensity, and duration. In certain instances, thresholds developed by the responsible federal agency are applied to determine significant impacts under NEPA. For example, there are federal air quality and noise standards that are applied to the NEPA evaluation. FRA, FHWA, and FTA guidelines also are used when applicable. In other cases, qualitative or quantitative analysis determine potential impacts in terms of context, intensity, and duration. The nature of this analysis will depend on the resource analyzed.

Method for Determining Significance under CEQA

For each resource topic, analysts use criteria based predominantly on the CEQA Guidelines to determine where and when mitigation measures are warranted to help reduce the magnitude and severity of adverse impacts. These criteria generally describe whether impacts would be considered significant or whether there would be a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project. Where possible, significance criteria use state or federal standards. For example, air quality significance criteria follow the state and federal ambient air quality standards; noise significance criteria use thresholds defined by FRA. In other cases, for example the visual resources analysis, the significance criteria rely on guidelines and policies, assessment methodologies such as those used by FRA, and standards of professional practice.

3.1.5.5 Affected Environment

The description of the affected environment summarizes existing, baseline conditions of resources that are sensitive or protected, or could be impacted by the HSR project and associated physical changes. The information focuses on environmental commitments, data and issues for analyzing potential effects. Information in the affected environment discussion is presented for the entire [section name] Section, including a discussion of the regional context.

The affected environment discussions describe the existing conditions available in the most recent, publicly available data or collected during field work in [insert year(s) field work was conducted for HSR section]. Where appropriate and not overly speculative, the anticipated 2035 conditions that would pertain without the project are used as the No Project condition. Projected 2035 conditions that have been adopted by regional or local planning agencies will be discussed where relevant to particular resources, such as transportation and air quality.

3.1.5.6 Environmental Consequences

The environmental consequences discussion describes the potential environmental impacts of the No Project Alternative and the HSR alternatives. The discussion of potential impacts of each alternative are organized by geographic segment and presented in the occurrence timeframe of construction or operations. Evaluations of direct and indirect project impacts reflect integration of project features to avoid or minimize impacts, as well as mitigation commitments derived from the Statewide and Bay Area to Central Valley Program EIR/EIS (as appropriate to the geographic location of the HSR project segment). This evaluation of direct and indirect project impacts will occur with consideration of impact avoidance and minimization features, yet before implementation of project mitigation measures. The explanations of impact significance include the context, intensity, and duration of the impact, other impact characteristics as appropriate (e.g., direct, indirect, adverse, or beneficial), and any applicable threshold(s) of significance (and implementation of mitigation measures for considerations of NEPA impact significance).

To fully understand a proposed project's environmental implications, CEQA and NEPA require that its effects be examined in conjunction with other past, present, and reasonably foreseeable projects. Section 3.19 discusses cumulative impacts for each resource and the relative importance of the HSR Project's contribution to any significant cumulative impact.

3.1.5.7 Mitigation Measures

NEPA requires federal agencies to identify potentially adverse effects and identify measures to mitigate those impacts. This is accomplished through the impact avoidance and minimization features that are part of project design and the mitigation measures proposed in EIR/EIS. CEQA requires that each significant impact of a project be identified and feasible mitigation measures be stated and implemented. Mitigation measures are identified for adverse construction period or operational impacts that cannot be avoided or minimized adequately by refining project design. The Mitigation Measures section identifies possible measures to avoid, minimize, rectify, reduce, eliminate, or compensate for significant adverse effects. If no mitigation measures are required, this section is not included. The mitigation measures are based on the mitigation strategies presented in the *Final Statewide Program EIR/EIS* (2005), the *Bay Area to Central Valley Program EIR/EIS* (2008; Revised Final EIR/EIS 2010) and *Partially Revised Final Statewide Program EIR/EIS* (2012), as they may apply to the [section name] Section. The programmatic mitigation strategies in the Program EIR/EISs provided a foundation for crafting mitigation measures and additional mitigation measures were identified where appropriate. The mitigation measures that will be applied to the HSR project are abbreviated "MM" and numbered in the order identified in the section. For example, the first mitigation measure for air quality impacts is AQ-MM#1 and for aesthetics and visual resources is AVR-MM#1.

3.1.5.8 NEPA Impacts Summary

This section summarizes the environmental consequences specific to NEPA requirements for each resource. Based on the discussion of the context, intensity, and duration of the potential impacts, this section reports impacts that remain significant under NEPA after implementing the recommended mitigation measures.

3.1.5.9 CEQA Significance Conclusions

This section lists the significant impacts identified in the Environmental Consequences section for each resource, reports the level of significance prior to mitigation, and indicates mitigation measures that are available to reduce the level of significance for each impact. If implementing a measure would reduce the potential impact below the applicable significance threshold, the impact would be considered less than significant after mitigation. If, however, implementing a mitigation measure cannot reduce the level of impact below the significance threshold, the impact would be considered significant and unavoidable. This section identifies the CEQA level of significance before and after mitigation.

3.1.6 Outreach to Local Agencies

Meetings and other outreach activities were conducted with the staff of local public agencies within the [section name] Section throughout preparation of the EIR/EIS. These meetings and other outreach activities have helped the Authority and FRA understand the on-the-ground conditions and the local environmental issues, understand the concerns of local agencies and the public, facilitate reconciliation of substantive concerns, and design effective and feasible mitigation measures. Chapter 8, Public and Agency Involvement, is an inventory of outreach activities undertaken during preparation of the EIR/EIS. Specific resource-related issues also are discussed in the respective resource sections of the document.

3.1.7 Legal Authority to Implement Offsite Mitigation

Chapter 3 analyzes the HSR project's potential physical environmental effects on various resource areas. If a potential significant effect is found, mitigation measures are proposed. Most mitigation measures identified are within the Authority's jurisdiction and control. Some of the proposed mitigation measures, however, would occur on property the Authority would not own as part of its right-of-way acquisitions. These are sometimes referred to as "offsite" mitigations. Mitigation that would occur on property not owned by the Authority would require working with the property owners involved or with the jurisdiction that regulates the property in order to accomplish that mitigation.

The Authority and FRA have not identified any offsite mitigation measures that they believe are infeasible or unlikely to occur. The offsite mitigation measures recommended in this EIR/EIS are physically feasible. The Authority will continue its current practice of developing memoranda of understanding and funding agreements with local governments to facilitate agreement on implementation of offsite mitigation measures on property owned at the local agency level.

3.1.8 Product

The Regional Consultant (RC) is responsible for preparing the project EIR/EIS Volume 1, Chapter 3 Introduction, under Authority and FRA direction, according to PMT guidance and subject to PMT quality control and assurance.

3.1.9 Chapter 3 Introduction EIR/EIS Outline

The RC will use the following outline for organizing the Chapter 3 Introduction of the project EIR/EIS Volume 1, using the heading hierarchy and format as indicated.

3.1 Introduction
- 3.1.1 Federal and State Regulatory Context
- 3.1.2 State and Regional Policy Context
- 3.1.3 Chapter 3 Purpose
- 3.1.4 Chapter 3 Organization

- 3.1.5 Chapter 3 Content
  - 3.1.5.1 Introduction
  - 3.1.5.2 Laws, Regulations, and Orders
  - 3.1.5.3 Regional and Local Policy Analysis
  - 3.1.5.4 Methods for Evaluating Impacts
  - 3.1.5.5 Affected Environment
  - 3.1.5.6 Environmental Consequences
  - 3.1.5.7 Mitigation Measures
  - 3.1.5.8 NEPA Impacts Summary
  - 3.1.5.9 CEQA Significance Conclusions
- 3.1.6 Outreach to Local Agencies
- 3.1.7 Legal Authority to Implement Offsite Mitigation

3.2 Transportation

The methodology guidelines in this section are organized by a sequence of steps for preparing an environmental document. Section 3.2.11 provides an outline for this environmental impact report/environmental impact statement (EIR/EIS).

Section 3.0, General Methodology Guidance for Resource Sections, provides the methodological framework common to the evaluation of all resource areas. Section 3.19, Cumulative Impacts, provides the cumulative impact analysis methodology. Use Section 3.0 and Section 3.19 in combination with this Transportation guidance section when developing the EIR/EIS analyses.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the resource section. Example text that illustrates the concepts and methods is shown in *italics*. The methods are organized to mirror the organization of the EIR/EIS section or chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

If there is a discrepancy between the material in this guidance and any adopted federal and state agency guideline or manual applicable to transportation, the agency guideline or manual controls. Identify and discuss any such discrepancy with the California High-Speed Rail Authority (Authority), Federal Railroad Administration (FRA), and the Program Management Team (PMT) before deviating from this guidance.

3.2.1 Introduction

The general method for preparing an introduction for this resource section is provided in Section 3.0.1, Introduction. The following discussion presents direction specific to Transportation.

Refer specifically to related content in other sections of the EIR/EIS that influence or are influenced by the transportation impact analysis (such as air quality, noise and vibration, public utilities, biological resources and wetlands, hydrology and water, hazardous materials and wastes, safety and security, station planning and land use, agricultural farmlands and forest lands, aesthetics and visual resources, regional growth) and supportive/associated technical documents. When referencing other documents, include citation to specific sections (by lowest heading tier, e.g., 3.X.X), not just a general reference to a chapter in the EIR/EIS.

3.2.2 Laws, Regulations, and Orders

Federal, state, and local laws, regulations, orders, or plans applicable to transportation resources and traffic management affected by the project are presented below. General NEPA and CEQA requirements for assessment and disclosure of environmental impacts are described in Section 3.1, Introduction, of these guidelines and are therefore not restated in the resource section of the chapter.

3.2.2.1 Federal

Procedures for Considering Environmental Impacts (64 Fed. Reg. 28545)

These Federal Railroad Administration procedures state that an EIS should consider possible impacts on transportation, including impacts of passengers and freight transportations; impacts by all modes of transport (including bicycle and pedestrian transport); impacts from relevant perspectives (including local, regional, and state perspectives); and impacts on roadway traffic congestion.

3.2.2.2 State

California Government Code Section 65080

The State of California requires each transportation planning agency to prepare and adopt a regional transportation plan directed at achieving a coordinated and balanced regional transportation system.

California Streets and Highways Code Section 1 et seq.

The code provides the standards for administering the statewide streets and highways system. Designated state route and interstate highway facilities are under the jurisdiction of the California Department of Transportation (Caltrans), except where facility management has been delegated to the county transportation authority.

3.2.2.3 Regional and Local

Compile a complete inventory of adopted local and regional plans, ordinances, or guidelines related to transportation. A tabular format similar to that used in the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014), or more recent HSR project EIR/EIS may be used to organize and concisely report this information.

This information will become part of Volume 2 Appendix 3.1-B Regional and Local Policy Inventory.

Airport Master Plans

Airport authorities prepare Master Plans that identify future air travel demand and development strategies to meet this demand. The master plans provide forecasts for future aviation demand as well as new or expanded airport projects. While both general and commercial aviation are addressed in airport master plans, information on intercity demand by commercial aviation will be of particular relevance to project-related environmental assessment. Information on intercity air travel demand will help inform the development of information relating to the affected environmental and baseline demand.

Caltrans District Plans (as applicable)

Caltrans plans, including Corridor System Management Plans (CSMP) at the District level, provide information on future development affecting State facilities. CSMPs are comprehensive and integrated management plans that address transportation options, congestion, and improving travel times in specific transportation corridors. A CSMP includes all travel modes in a defined corridor—highways and freeways, parallel and connecting roadways, public transit (local and intercity), and bikeways. Intelligent transportation technologies can also be addressed, including ramp metering, coordinated traffic signals, incident management, bus/carpool lanes and car/vanpool programs, and transit strategies. Each CSMP identifies existing travel conditions, corridor performance management, planning management strategies, and capital improvements. Information from District-level plans is relevant for the affected environment and supports the assessment of baseline and project conditions.

Regional Transportation Plans

Region-scale planning for transportation infrastructure and programs, management of transport-related air quality impacts, and guidance for local land use decisions related to transportation is governed by a designated congestion management agency (CMA). The regional entity that is responsible for CMA actions may be a council of governments, county association of governments, county or local transportation commission, transportation or transit authority or agency or district, or joint powers agency, depending upon local agency preferences, population density (e.g., urban or rural counties or municipalities), or transportation purpose. CMAs are responsible

for preparing metropolitan transportation plans, regional transportation plans, and local transportation plans.

County or Municipal General Plans or Community Plans

Counties and cities must prepare general plans with transportation policies and ordinances. The transportation (or circulation) element of the local comprehensive plan articulates the policies and priorities that govern the establishment of local transportation performance standards, such as level of service (LOS), and capital investment programs to achieve local transportation objectives. The transportation element also contains an inventory of primary facilities, presented in descriptive text and a circulation diagram. General plans provide important context information for impact assessment.

Public Transportation Plans

Public transportation agencies must adopt plans that guide future service and facilities development.

Consider whether the project conflicts with or enhances adopted policies, plans, facilities, or programs supporting public transportation (e.g., bus turnouts, bus-only lanes, changes/additions to bus routes).

Transportation Plans, Policies, and Programs for Non-Motorized Transportation

Both regional and local governments adopt plans for non-motorized transportation to guide public investment in capital infrastructure and operational programs.

Consider whether the project conflicts with or enhances adopted policies, plans, facilities, or programs supporting alternative and non-motorized transportation (bicycle lanes, bicycle routes and racks; sidewalks and pedestrian access facilities). (*Note:* recreational bicyclist or pedestrian facilities, such as Class 1 bikeways or walking/hiking trails, are evaluated in Section 3.15, Parks, Recreation, and Open Space.)

3.2.3 Regional and Local Policy Analysis

The overall structure of this discussion is presented in Section 3.0.3, Regional and Local Policy Analysis. As described in more detail in subsection 3.0.3.2, this analysis will describe any inconsistency or conflict with adopted regional or local policies and implementation of the HSR project.

3.2.4 Methods for Evaluating Impacts

Evaluation of impacts on transportation is a requirement of NEPA and CEQA. Identify transportation system elements along the HSR guideway, stations, station areas, and, where appropriate, heavy maintenance facilities. The transportation elements, both existing and future, will be defined in Airport Master Plans, Caltrans District Plans as well as local and regional transportation plans as described above in Section 3.2.2.3. Incorporate, as appropriate, information from other elements of the EIR/EIS in the evaluation of transportation impact (e.g., from Section 3.13, Station Planning, Land Use, and Development). Describe prior and on-going efforts to avoid transportation impacts in the project EIR/EIS.

This section describes the methodology for developing the resource study area (RSA) and for evaluating effects under CEQA and NEPA. Subsequent sections in this methodology provide direction for the design of mitigation measures and the structure for presenting content related to transportation in the EIR/EIS documents.

3.2.4.1 Definition of Resource Study Area

The RSA is the area in which all environmental investigations specific to transportation are conducted in order to determine the resource characteristics and potential impacts of the Project Segment. The factors making up the RSA and the description of the elements comprising the RSA (including an illustrative figure) are provided in Section 3.0.4.1, Definition of Resource Study Area.

The boundaries of the RSA for transportation extend beyond the project footprint. The transportation impact analysis focuses on operating conditions in terms of LOS. LOS is the primary unit of measure for stating the operating quality of a roadway or intersection and is qualitative, with a ranking system of "A" through "F," where LOS A signifies the best and LOS F, the worst operating conditions (Caltrans 2010a). The *Highway Capacity Manual* procedures are followed in calculating the LOS. LOS thresholds for roadways, signalized intersections, and unsignalized intersections are described below (Transportation Research Board (2000) 2002).

The study area for direct impacts includes the area of potential disturbance associated with project construction, as well as intersections and transportation facilities within 0.5 to 1.0 mile, particularly around stations. For indirect impacts on transportation, the study area includes the extent of the roadway networks that may reflect change in circulation due to project conditions. Traffic around the maintenance facility sites also could be affected by the project, so the study area also includes the vicinity of the maintenance facilities. In short, the study area for indirect impacts extends as far from the project footprint that project-created traffic changes can be meaningfully detected; this determination must be documented.

Table 3.2-1 presents the required information sources and baseline metrics to help define the resource study area.

Table 3.2-1 Resource Study Area Information

Required Information	Resource Study Area
▪ Project description—HSR system, linear and sited facilities, operations, ancillary improvements ▪ Project plans and profiles, other design materials in sufficient detail to complete environmental impact assessment of all proposed improvements and operations within the affected geographic area ("project footprint") – Design elements include the HSR project and related facilities, temporary access and construction/ staging areas, required roadway modifications, utility improvements and connections, etc. ▪ Guideway, station, and heavy maintenance locations and footprints in sufficient detail to complete environmental impact assessment of all construction and operations, regardless of implementation or operating entity ▪ Construction phases and interim build conditions/transitions for all project and ancillary improvements and stations	▪ Direct impacts—Entire project footprint on or across transportation systems (for direct impacts) ▪ Indirect impacts—Includes environmental envelope that would extend beyond the project footprint, including intersections and roadways surrounding stations, heavy maintenance facilities, severed roadways, or closed access to the transportation network ▪ Railroad lines, highways, or roadways that are within or cross the project corridor ▪ Highways and roadways that serve as the primary means of access to/from proposed rail stations or are functionally affected by the project ▪ Critical intersections that are within a 1-mile radius of proposed rail station ▪ Existing or planned bicycle or pedestrian facilities crossed by the alignment or within 1 mile of an HSR station ▪ Parking facilities within 0.5-mile of an HSR station ▪ Existing and planned public transit systems and other ground access systems serving HSR stations ▪ Intersections beyond the 1-mile[1] radius, as determined in consultation with the local jurisdiction ▪ At-grade crossings along HSR corridors, including formal transportation facilities and established private property crossings

[1] Distances, whether included in this methodology or not, should be not relied upon blindly. The distances provided in this Table 3.2-1 and elsewhere in this methodology are starting guidelines. The analysis should explain the approach taken to selecting facilities within the RSA to evaluate.

The RSA for cumulative effects will be a broader area depending on the project section and will consider adjacent HSR project sections to ensure consideration of impacts on a more regional and statewide basis. See Section 3.19, Methodology for Cumulative Impacts, for a more detailed discussion.

3.2.4.2 Methodology for Impact Analysis

Overview of Impact Analysis

Group and consolidate information and discussion in the EIR/EIS to effectively present content to the lay audience (i.e., by distinct resource characteristic or component, such as roadways or intersections). Present information on roadway modifications, crossings, and closures as well as operating conditions (LOS) of affected roadways and intersections resulting from the proposed HSR alternatives for both the operations and construction-related phases of the project. See section below on Baseline for more details.

Present detailed information from and specific references to the EIR/EIS Volume 2 Appendix associated with this resource. Provide references of sufficient detail to help the reader navigate between EIR/EIS volumes. Analyze direct and indirect impacts related to transportation through quantitative analysis and, where necessary, with qualitative analysis. Analyze impacts which may occur during construction and operation of the HSR system.

Construction and Operations Impacts

Present the analytical results for construction impacts and operations impacts separately in the EIR/EIS. Refer to section 3.0.6 for a detailed description of these impact timeframes and associated impact durations. Apply the same impact thresholds in both project timeframes. Operations impacts include permanent impacts and interim impacts that are due to incremental operational implementation of the Phase 1 HSR program.

For stations that are interim HSR system termini for an implementation stage before the completion of Phase 1, evaluate operations impacts for both the Phase 1 horizon year (permanent impacts) and for the pre-horizon year with the highest station ridership and associated transportation impacts (interim impacts). Analyze and disclose impacts at interim HSR system termini separately from the analysis and mitigation of permanent operational impacts based on the Phase 1 horizon year, but attempt to reconcile the mitigation measures list so that the HSR is not building overlapping and potentially inconsistent mitigations. See section below on Baseline for more details.

Focus analysis on the project's potential to alter existing conditions of the affected resources in the RSA(s). This will include estimated changes in operating conditions of road segments and intersections as a result of demand at the HSR station.

Beneficial Impacts of Project

The project will provide benefits in the form of high-quality intercity rail service. With diversion of some travel demand from autos and air to high-speed rail, the transportation system will have lower volumes of vehicles as compared to a no-build scenario. Identify these project benefits, including the net reductions in vehicle volumes, in the analysis and take into account in the evaluation of impact significance.

Basis for Analysis

Do not assume facts. Determine and verify all facts needed for analysis and subsequent impact determinations and mitigation measure design. If an exact fact cannot be determined and verified, provide an estimate and explain clearly (1) the reasonable rationale for the estimate, (2) the basis for the estimate, and (3) the reason(s) the actual fact cannot be determined. For

example, definitive details of fair-share pooling of funds (possibly via local programs and plans) for mitigation of impacts only partially due to HSR may not be verifiable during preparation of the EIR/EIS.

Base the analysis on a review of available reports and data (including federal and state statutes, resource agency, local, and regional agency policies and ordinances), discussions with agency representatives in the region, field investigation, existing and potential new traffic counts, travel forecasting databases, public transportation plans, and professional judgment. Begin consultation and coordination with local government traffic engineers early in the analysis, including discussions on the approach to traffic assessments,[2] meeting LOS standards,[3] and thresholds of significance. See Section 3.2.2 subsection Laws, Regulations, and Orders for important information resources for this task.

While transportation-related thresholds have been determined by NEPA and CEQA guidance, discussions with local jurisdictions provide an opportunity to identify any potential concerns and approaches to resolving the concerns. Continue discussions with local agencies through design of mitigation measures, evaluation of measure feasibility, effectiveness, and implementation. These discussions will be particularly helpful in identifying approaches to coordination of mitigation efforts with other potential transportation projects by local jurisdictions in station areas and along the HSR project guideway.

Development and Use of GIS Databases

Geographic information systems (GIS) databases will be developed for each project segment. Develop all GIS data (1) as part of project design or (2) from available federal, state, and local sources. The GIS and other information must have sufficient detail to allow the following activities relating to impacts analyses:

- A comprehensive assessment of the anticipated design for the completed project.
- Key assumptions for project features, including those that will be used to assess impacts for potential baseline periods. These features include structures for grade-separated alignment crossings and water crossings, areas requiring road closures, maintenance road access, all electrical and utility connections, or modifications affecting traffic circulation.
- Key assumptions for non-project related features, particularly the anticipated roadway network at the time of project completion and at baselines for analyses of future impacts.
- Key assumptions relating to any proposed mitigation features; the development of GIS for any mitigation measure must be closely coordinated with GIS information developed for the project.
- Other key information from the GIS data that will be relevant to assessment of transportation-related environmental impacts.

Coordinating Mitigation Definition with Project Design

Maintain frequent coordination with the HSR section engineering team to ensure that the latest planning and design refinements that affect transportation facilities, such as resolution of local access solutions and design of mitigation measures, are identified and evaluated in the transportation analysis. Address transportation facilities by local jurisdictions, other public transportation authorities, and Caltrans. Where analysis reveals traffic impacts for which

[2] Local traffic engineers' input about intersections to study is very important and helpful and should be documented, but is not the sole basis to determine which intersections to study. An *analytical* basis for that determination must be made and documented.

[3] Determine if local jurisdiction or regional CMP LOS standards (whether measurement methodology or thresholds) differ from the Authority's adopted standards, and document the results. If they do differ, identify these differences and explain qualitatively the consequences without making any significance conclusion, because the local and regional standards are not legally applicable to HSR; the disclosure and information is important, however.

mitigation would be near or part of HSR project construction, provide timely input to the HSR section engineering team and PMT to ensure appropriate integration of HSR mitigation and project construction plans. Coordinate mitigation and project design throughout EIR/EIS preparation to ensure that project plans and specifications accurately track changes in mitigation design.

In addition to coordination with project design efforts, coordinate any traffic mitigation measures affecting local roadways and intersections with the local public works agency. This will ensure that the measures incorporate appropriate local engineering standards are feasible and reasonable for the local agencies to implement and are consistent with their long-range planning programs.

Consistency of Methodologies

The methodology used to evaluate transportation impacts is generally based on those developed by the Transportation Research Board, specifically the *High Capacity Manual*. Use the *Station Boarding, Access, Egress, and Parking Guidance* technical memorandum for station access and egress traffic generation trip numbers, methodology, and guidance. Include a review of the data and impact analyses in the other sections prepared for the EIR/EIS, including Air Quality and Global Climate Change, Noise and Vibration, Safety and Security, Station Planning, Land Use, and Development, Agricultural Farmland and Forest Lands, Aesthetics and Visual Quality, and Regional Growth.

Examples of coordination with other resource analyses include:

- Transportation elements in station planning—Access to the stations from nearby communities may affect the existing and planned transportation network. If this access gives high priority to walk and bicycle access, recognize this modal emphasis. Also, ridership output from the station area analysis is a key input to the traffic analysis (e.g. peak hour volumes)
- Use of transportation analysis outputs for other resource analyses—Air quality analysis may require the transportation-related information in a particular format. Because the output from the transportation can affect other types of analyses, such as noise and vibration or energy, become familiar with the other methodologies prior to initiating work. This familiarity includes the schedule for when key information from the transportation analysis is required for other impact analyses.

Table 3.2-2 provides illustrative examples of construction and operation impacts.

Coordination of Analyses for Section Terminals

Closely coordinate between respective HSR Regional Consultants (RCs) on traffic analyses at locations where effects may overlap with adjacent HSR sections to ensure correct and consistent evaluation of impacts that extend beyond HSR section endpoints. For example, traffic impacts associated with the Palmdale HSR station will extend into both the Bakersfield to Palmdale Section and the Palmdale to Los Angeles Section. To ensure that this coordination takes place, the RCs responsible for the analysis will take the following steps: (1) conduct a joint meeting (conference call will be acceptable) to discuss major assumptions, data sets, information sources relating to the transportation assessment for common station areas; (2) conduct a joint meeting (conference call will be acceptable) to review draft results of the transportation assessment, including NEPA and CEQA threshold analyses and the mitigation program; and (3) jointly prepare a technical memorandum documenting results of the analysis for the common stations. Refer to this technical memorandum in the environmental assessment documentation for the respective HSR sections.

Table 3.2-2 Source and Description of Transportation Impacts

Source of Impacts	Description of Impacts
Construction activities with potential for impacts to transportation due to temporary or permanent physical change on the landscape by project facilities such as the guideway and supporting structures, HSR-related infrastructure and facilities, stations, parking structures/lots	▪ Effect of construction on emergency access – Potential for traffic congestion resulting from construction to disrupt access or circulation of emergency vehicles – Potential for road closures, lane closures, or detours to interfere with emergency access ▪ Effect of construction on non-motorized mobility – Potential for non-motorized connections to and across HSR facilities during construction ▪ Effect of construction on transit service – Potential for traffic congestion resulting from construction to disrupt or delay bus service – Potential for road closures, lane closures, or detours to interfere with transit routes ▪ Effect of construction on travel routes and property access – Potential for traffic congestion, increased trip distances, and travel times resulting from road closures, lane closures, detours, rail or road crossing closures, or reconfigurations – Potential for interference with access to property or business resulting from road closures, lane closures, detours, rail or road crossing closures, or reconfigurations
Operational impacts result ongoing rail service and maintenance activities of the HSR system	▪ Effect on buses at or near HSR stations – Potential for inadequate capacity of feeder bus service – Potential for traffic congestion resulting from project to disrupt or delay bus services that serve or run near stations or other transit operations – Potential changes in bus routes due to roadway changes and elimination of at-grade crossings

Include the following information in the environmental document:

- A detailed map of sufficient scale to illustrate the geographic relationship of the alternatives to the transportation system. The map boundary shall not exceed the extent of a project segment, and must clearly show the location and areal extent of project impacts and major landscape features (e.g., highways, major roads, local jurisdictions, perennial water bodies, or other geographical landmarks or features that convey relative location and size). Obtain Authority, FRA, and PMT concurrence on the mapping scale before preparing an administrative draft EIR/EIS.
- Function, type, and location (e.g., maps or other exhibits such as photographs) of the affected transportation system elements
- Relevant ownership or operational characteristics

Baselines

The issue of the proper environmental baseline(s) for transportation analysis has been the subject of extensive CEQA case law since 2010, culminating with the 2013 California Supreme Court decision in *Neighbors for Smart Rail vs. Exposition Metro Line Construction Authority* (2013) 57 Cal. 4th 439, 447-457. The Court decision essentially concludes that traffic analysis should be presented using a baseline (pre-project conditions) year that matches when a project will commence causing traffic impacts. The Court calls this a "date-of-implementation" baseline.

The traditional analysis using some date in the future not directly tied to the project implementation year no longer can be relied upon by itself.

The *Neighbors* decision is helpful, but requires thought to implement in a project like HSR that has different components that could have different operational traffic impacts at different stages. For example, the project generally has three types of traffic impacts: (1) impacts caused by re-routing existing traffic to other intersections as a result of the alignment severing or modifying the road network, (2) impacts caused by adding HSR station traffic to the network, and (3) a combination of the first two in which an intersection both receives traffic redirected by a road severance (for example) and receives HSR station traffic.

This is further complicated by the potential for the road-severance impacts to happen years before the HSR-station-traffic impacts, and by HSR-station-traffic impacts rising over time as HSR passenger volume grows (and by impacts peaking and then falling over time if the station is an interim terminus station, such as Burbank). More complicated still is the potential for different analyses to produce different but potentially competing, overlapping, or partially duplicative mitigation requirements.

The methodology for transportation-related environmental impacts presents baselines for analysis that are consistent with the *Neighbors* conclusion while also recognizing the framework of HSR planning and implementation. Any discussion of Existing Conditions will reflect those in place at issuance of the Notice of EIR/EIS Preparation (NOP) or at the time when EIR/EIS environmental analysis is initiated. The four potential baselines to be used for assessing project impacts are as follows:

1. Environmental Baseline #1: Existing + Construction—Impacts could include any road closures or lane reconfigurations that will be implemented during construction. These could be temporary impacts associated with construction, as well as permanent impacts affecting traffic movement through the altered roadway network.
2. Environmental Baseline #2: Date of Project Implementation—The analysis will consider estimated daily project ridership levels at the date of HSR segment implementation. These estimates will be consistent with information in the most recently adopted HSR Business Plan and will include the years of implementation for the following phases: Initial Operating Segment, Bay to Basin, and Phase 1. The methodology will use the year that trains will begin operation on that segment (according to latest adopted Business Plan; e.g., for the 2014 Business Plan: 2022 for Initial Operating Segment, 2027 for Bay to Basin, 2029 for Phase 1).
3. Environmental Baseline #3: Interim Terminus Stations—This will reflect maximum ridership at a timeframe between the date of implementation and horizon year. A separate analysis of impacts at interim terminus stations shall be included, if applicable, for Authority consideration in consultation with the FRA and station cities. The analysis shall determine the magnitude, severity, and duration of interim impacts and potential mitigation options.
4. Environmental Baseline #4: Completion of Phase 1 (Horizon year) with Full Ridership—The timeframe for this baseline is indexed to the Regional Transportation Plan(s) applicable to the HSR section (per NEPA practice) and the adopted HSR Business Plan. Current horizon year for HSR is 2040, but the horizon year will advance as RTPs and the HSR Business Plan are updated. The analysis may also consider completion of Phase 2 in future studies, as warranted by Authority business planning and as directed by the Authority.

Structure the impact analysis to allow incremental assessment of impacts related to road closures or lane reconfigurations implemented during construction and HSR station traffic and circulation at initiation of rail service. Prepare a summary matrix that categorizes impacts from all four baseline analyses and the cumulative assessment, primarily by construction impacts and operations impacts, and secondarily by interim impacts and permanent impacts. Present details in the *Transportation Technical Report*.

For the analysis of Cumulative Impacts, use the horizon year analysis that has been created for the Transportation Section. The cumulative impacts evaluation consists of a two part assessment, as described in further detail in Section 3.19. First, will the project in combination with the past, present, and reasonably foreseeable future actions result in a significant cumulative impact? Second, if the cumulative impact is significant, will the project contribution to the significant cumulative impact be "considerable"?

For all impacts, determine significance of impacts under NEPA and CEQA based on the application of the following methods.

3.2.4.3 Method for Determining Significance under NEPA

As described in more detail in Section 3.0.4.3, NEPA does not provide a definitive threshold to determine significant or potentially significant impacts to transportation. Procedures for Considering Environmental Impacts (64 Fed. Reg. 28545) indicate that an EIS should consider possible impacts on all modes of transportation, including passenger and freight rail, as well as potential impacts on roadway traffic congestion. In cases where there are no defined thresholds, use professional judgment when considering the resource context, the intensity and duration of the potential effect, along with implementation of mitigation measures to determine whether an impact is significant or less than significant. See Section 3.0.4.3 for further discussion of NEPA thresholds.

3.2.4.4 Method for Determining Significance under CEQA

Based on CEQA Guidelines, the project would have a significant transportation impact if conditions change as described below. These changes involve both the operational phase of the project and its construction phase.

Operational Phase

The traffic impact criteria used in evaluating traffic LOS for roadway segments, and signalized and unsignalized intersections during the project operation phase are presented below.

For roadway segments, the significance criteria are based on the change in volume to capacity (V/C) ratio as follows:

- An impact is considered to be significant if the addition of project-related traffic results in a reduction in LOS below LOS D.
- For segments that are projected to operate at LOS E or F under baseline conditions, an impact is considered to be significant if the addition of project-related traffic results in an increase in the V/C ratio of 0.04 or more.

For signalized intersections, the significance criteria are based on an increase in delay based on LOS as follows:

- An impact is considered to be significant if the addition of project-related traffic results in a reduction in LOS below LOS D.
- For intersections that are projected to operate at LOS E or F under baseline conditions, an impact is considered to be significant if the addition of project-related traffic increases average delay at an intersection by 4 seconds or more.

For unsignalized intersections, the significance criteria are based on an increase in delay for the worst movement for a multi-way stop and the average intersection delay for an all-way stop as follows:

- An impact is considered to be significant if the addition of project-related traffic results in a reduction in LOS below LOS D.

- For intersections projected to operate at LOS E or F under baseline conditions, an impact is considered to be significant if the addition of project-related traffic increases delay for the worst approach or movement at an intersection by 5 seconds or more and if the intersection satisfies one or more traffic signal warrants[4] for more than 1 hour of the day.

The project also could have a significant effect on the environment if it would do the following:

- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities or otherwise materially decrease the performance or safety of such facilities
- Result in inadequate emergency access
- Substantially increase hazards due to a design feature (such as sharp curves or dangerous intersections) or incompatible uses (such as farm equipment)

Construction Phase

The project would have a significant effect on the environment if it were to do any of the following:

- Result in inadequate emergency access
- Substantially increase hazards due to a design feature (such as sharp curves or dangerous intersections) or incompatible uses (such as farm equipment) or create safety risks for pedestrians and bicyclists

3.2.5 Affected Environment

Include a concise summary description of the existing transportation system along the proposed HSR alignments and at proposed HSR facilities. In particular:

- Identify highway and street network, including intersections as well as other transportation elements. These other elements include public transportation service and facilities; bike and sidewalk facilities; railroad, roadway, and other established grade-separated and at-grade crossings of the proposed HSR alignments. A map may be created to illustrate the locations of transportation facilities.
- Document established local policies concerning the context of transportation-related impacts, such as local and regional LOS standards from documents such as general plans and CMPs.
- Describe pertinent stakeholder issues and concerns from public outreach efforts and personal contact with local agencies.
- Cross-reference all sections of the EIR/EIS (by lowest heading tier, e.g., 3.X.X) that describe the resources or are related to transit and transportation (e.g., Section 3.13.5, Station Planning, Land Use, and Development Affected Environment).
- For HSR station areas that are in common with other sections, identify coordination efforts with adjacent sections. For example, for the Bakersfield to Palmdale Section, coordination efforts with the Palmdale to Los Angeles Section will be described, specifically the affected environment for the Palmdale Station (common to both sections).

The following tables (Table 3.2-3 through Table 3.2-12) provide key information needed for a complete description of the affected environment and typical sources for the information.

[4] Traffic signal warrants define minimum conditions under which signal installation may be justified.

Table 3.2-3 Key Information and Sources for Affected Environment

Key Information	Sources of Information
▪ Characteristics of roadways within the RSA/ segment ▪ Average daily traffic, a.m. peak, and p.m. peak hour traffic volumes ▪ Future plans affecting transportation development	▪ Local jurisdiction general plan, specific/area plans ▪ Regional transportation plans ▪ Public transportation plans

3.2.5.1 Regional Transportation System

Table 3.2-4 Key Information and Sources for Highways and Roadways

Key Information	Sources of Information
▪ Characteristics of roadways within the RSA/ segment ▪ Average daily traffic, a.m. peak, and p.m. peak hour traffic volumes ▪ Future plans, growth and projects affecting transportation development ▪ Existing highway, roadway, and intersection levels of service ▪ Programmed/funded highway and roadway improvements within the RSA	▪ Local jurisdiction general plan, specific/area plans ▪ Local government knowledge of pending and planned projects that could modify the transportation network and/or add traffic to that network ▪ Regional transportation plans ▪ State highway plans (State Transportation Improvement Program, State Highway Operation and Protection Program) ▪ Congestion management programs and congestion monitoring reports ▪ California Traffic and Vehicle Data Systems Unit ▪ *Highway Capacity Manual* (Transportation Research Board 2000)

Table 3.2-5 Key Information and Sources for Intercity Transit and Air Travel

Key Information	Sources of Information
▪ Description of transit infrastructure (transit stops, stations) within the RSA/segment—current and future ▪ Summary of intercity bus and rail transit services (routes, days/times of service, frequency) characterized under baseline scenario of impact analysis—current and future ▪ Park-and-ride information for transit services ▪ Description of airports located within the RSA/ segment or location of nearest commercial airport outside of the RSA ▪ Future development plans by airports	▪ Regional transportation plans ▪ Public transportation plans (Intercity travel) ▪ California Aviation Systems Plan ▪ Local jurisdiction airport master plans

Table 3.2-6 Key Information and Sources for Freight and Goods

Key Information	Sources of Information
▪ Description of designated freight truck routes in the RSA/segment ▪ Identification of average percent volumes of trucks on designated freight routes ▪ Identification of freight rail lines that travel through or stop within the RSA/segment ▪ Summary of freight rail service (routes, frequency) ▪ Goods movement characterized under baseline scenario of impact analysis	▪ Local jurisdiction general plan, specific/area plans ▪ Regional transportation plans ▪ California's Department of Transportation Planning Goods Movement Plan ▪ Railroad companies

Table 3.2-7 Key Information and Sources for Plans and Policies

Key Information	Sources of Information
▪ Identification of adopted LOS standard for local jurisdictions within the RSA ▪ Identification of local policies relevant to the project and alternative transportation modes	▪ Local jurisdiction general plans, specific/area plans, ordinances ▪ Public transportation plans ▪ Congestion Management Plans (CMP)

3.2.5.2 Local Transportation System

Table 3.2-8 Key Information and Sources for Highways, Roadways, and Intersections

Key Information	Sources of Information
▪ Characteristics of roadways, intersections, and railroad/roadway/private grade crossings within the RSA/segment ▪ Average daily traffic, a.m. peak, and p.m. peak hour traffic volumes ▪ Future plans, growth and projects affecting transportation development ▪ Existing highway, roadway, and intersection levels of service ▪ Programmed/funded highway and roadway improvements within the RSA	▪ Local jurisdiction general plans, specific/area plans ▪ Regional transportation plans ▪ Public transportation plans ▪ State highway plans (State Transportation Improvement Program, State Highway Operation and Protection Program) ▪ Congestion management programs and congestion monitoring reports ▪ California Traffic and Vehicle Data Systems Unit ▪ *Highway Capacity Manual* (Transportation Research Board 2000)

Table 3.2-9 Key Information and Sources for Local and Regional Transit

Key Information	Sources of Information
▪ Description of transit infrastructure (transit stops, stations) within the RSA/segment ▪ Summary of bus and rail transit service (routes, days/times of service, frequency) characterized under baseline scenario of impact analysis ▪ Park-and-ride information for transit services	▪ Local transit agencies ▪ Regional transportation plans ▪ Public transportation plans, local jurisdiction general plan, specific/area plans

Table 3.2-10 Key Information and Sources for Non-motorized Travel

Key Information	Sources of Information
▪ Description of existing walkways and pedestrian access facilities in the RSA/segment ▪ Description of Class 2 bicycle lanes and designated Class 3 bicycle routes in the RSA/segment ▪ Location of major generators of pedestrian and bicycle traffic within the RSA/segment	▪ Local jurisdiction general plans, specific/area plans ▪ Local jurisdiction or regional bicycle and walkway/pedestrian master plans ▪ Regional transportation plans ▪ Public transportation plans

Table 3.2-11 Key Information and Sources for Parking Facilities

Key Information	Sources of Information
▪ Description of parking supply of parking facilities within the RSA/segment ▪ Description of parking facilities to be provided for the HSR system	▪ Local jurisdiction general plans, specific/area plans, ordinances ▪ Public transportation plans ▪ Local parking inventories ▪ Field investigation

Table 3.2-12 Key Information and Sources for Plans and Policies

Key Information	Sources of Information
▪ Identification of adopted LOS standard for local jurisdictions within the RSA ▪ Identification of local policies relevant to the project and alternative transportation modes	▪ Local jurisdiction general plans, specific/area plans, ordinances ▪ Public transportation plans ▪ Congestion Management Plans (CMP)

3.2.6 Environmental Consequences

General formatting and terminology for constructing the discussion of environmental consequences is provided in Section 3.0.6, Environmental Consequences. The following direction is specific for the evaluation of transportation. The heading structure for transportation is shown in Section 3.2.4 in these guidelines.

Give each impact a short descriptive title, e.g. *Construction Material Hauling would not result in safety risks for pedestrians and bicyclists,* as well as an impact number, e.g., *TR #1*. Explain the results of the analysis prescribed in Section 3.2.4. In particular, describe how the activity or physical change causes an impact upon the resource—for example, how project construction activities will affect circulation (including redirecting existing traffic at existing intersections, thereby affecting LOS), including emergency access, or how vehicle traffic generated by the project will impact LOS conditions in station areas. Simplify impact discussions whenever possible with references or citations to the more detailed information in the appendices. Use tables whenever possible to summarize the impacts and simplify the text.

The consistency of transportation-related analysis results for those station areas that are in common with two HSR sections is imperative. Work with the PMT to identify approach and assure consistent analysis. For example, one section could provide the results for the common station as long as it does not affect the schedule of the respective section(s). For stations that are interim HSR system termini for a stage of HSR implementation, evaluate the environmental consequences of operational impacts for both the Phase 1 horizon year and for the pre-horizon year with the highest station ridership and associated transportation impacts.

The NEPA and CEQA assessments shall reach specific, separate conclusions about significance for each impact based on the significance criteria and methods defined in the NEPA and CEQA subsections of Section 3.2.4.

3.2.7 Mitigation Measures

General formatting and terminology for constructing the discussion of mitigation measures is provided in Section 3.0.7, Mitigation Measures. The following direction is specific for the evaluation of transportation. Present the mitigation measures associated with the project alternatives within each geographic segment under the subheadings of Construction and Operations. The heading structure for the transportation EIR/EIS discussion is shown in Section 3.2.11 in these guidelines.

The transportation impacts assessment associated with each of the baselines for impact analysis could result in a program of mitigation measures. Use the transportation impacts summary matrix described in Section 3.2.4.2 to assemble a unified package of mitigation measures that describes phasing, responsibility, triggers, and duration for each mitigation measure. Assign responsibility and timing for the implementation of mitigation measures according to impact timeframe (e.g., construction or operation) and duration (e.g., permanent or interim). Measures should resolve the impact when it occurs (preferably not earlier) and be additive to avoid or minimize building a mitigation measure only to have it torn up later.

Develop project-level measures that are consistent with adopted program and project strategies that avoid or minimize impacts. Give each mitigation measure a short descriptive title and a number, such as *TR-MM#1*, which corresponds to the primary significant impact for which the measure is proposed (if practical). Draft mitigation measures to facilitate transition into the MMEP by clearly identifying responsibility and timing for implementation, as appropriate. For example, from the *Fresno to Bakersfield Section Final EIS/EIR*, see *TR-MM#1: Access Maintenance for Property Owners.*

> *If a proposed permanent road closure restricts current access to a property, the Authority will provide alternative access via connections to existing roadways. If adjacent road access is not available, the Authority will prepare new road connections, if feasible. Alternative access shall maintain the viability of the property use as it was used prior to the initiation of HSR project construction. If alternative road access is not feasible for a permanent loss of property access, the property will be acquired by the Authority. This mitigation measure would be effective, given the listed approaches available to address all potential scenarios encountered. Impacts associated with permanent road closures will be reduced*

to a negligible intensity under NEPA and a less-than-significant impact under CEQA with Mitigation Measure TR MM#1.

Design mitigation to return the environment to pre-project conditions (i.e., an intersection operating pre-project at LOS E does not have to be mitigated to LOS D). Begin by considering programmatic mitigation strategies identified in Section 3.0.7, and resource-specific guidance, as applicable to the HSR project section, from the transportation-related technical reports and environmental document sections in the most recent environmental document produced by the Authority (e.g., *Fresno to Bakersfield Section Final EIR/EIS*, or more recent HSR project EIR/EIS).

Potential mitigation measures for transportation include the following example:

For any road closures resulting from project construction, maintain access for owners to property within the construction area to a level that maintains pre-project viability of the property for its pre-project use. If a proposed road closure restricts current access to a property, provide alternative access via connections to existing roadways. If adjacent road access is not available, prepare new road connections, if feasible. If alternative road access is not feasible, the property will be considered for acquisition.

To address LOS impacts at intersections, consider the following:

- Modify traffic signal phasing sequence to improve operations at a signalized intersection.
- Add traffic signals to affected non-signalized intersections surrounding proposed HSR station locations to improve LOS and intersection operation. Intersections proposed for signalization must meet traffic signal warrants to be considered as impacted. This condition occurs in 2035 for the identified intersections, but the warrant criteria may or may not be met at earlier dates. Therefore, the signalization mitigation would only be required at such a time (between 2020 and 2035) as the warrant is met.
- Restripe specific intersections surrounding proposed HSR station locations to improve LOS and intersection operations.
- Revise signal cycle length at specific intersections surrounding proposed HSR station locations to improve LOS and intersection operations.
- Widen approaches to improve LOS and intersection operation.
- Add exclusive turn lanes at specific intersections to improve LOS and intersection operations.
- Add additional roadway lanes to improve LOS and intersection.

As discussed in the *Station Boarding, Access, Egress, and Parking Guidance* technical memo, mitigation measures shall address the significant permanent operational impacts identified by the Phase 1 horizon year analysis.

3.2.8 Impacts from Implementing Mitigation Measures

General formatting and terminology for constructing the discussion of impacts from implementing mitigation measures is provided in Section 3.0.8, Impacts from Implementing Mitigation Measures.

Mitigation measures can cause both positive and negative impacts that must be disclosed and considered as part of the environmental analysis. As discussed in the previous example of mitigation measure for loss of owner access to property, providing alternative access via connections to existing roadways or a new road connection could trigger the need to assess possible indirect traffic impacts. Review possible impacts associated with new road connections or other transportation mitigation measures.

Evaluate all mitigation measures, including off-site measures, using the methods in Section 3.2.4. Determine probable impacts using actual, on-the-ground analysis and describe the substantial basis for analytical conclusions (including defined thresholds or other criteria). Design and lay out all mitigation measures over existing conditions aerials. Determine existing right-of-way widths. Conduct site visits to verify that mitigation will fit and will not cause secondary impacts. Identify modifications on the ground to allow the mitigation (e.g., sidewalk relocation). Detail and document this effort; conclusory statements are not acceptable. Considering the previous mitigation measure example from the *Fresno to Bakersfield Section Final EIR/EIS*, this text of *TR-MM#1 Access Maintenance for Property Owners* illustrates the approach to discussing mitigation measures impacts:

> *If the project requires the replacement of property access due to a permanent loss from the project, mitigation may result in impacts on the physical environment. Those impacts would include emissions and fugitive dust from construction equipment, construction-related noise, construction-related road closures or traffic delays and impacts on biological and cultural resources that may be present on the site of the new property access route. Any new or expanded roadways would be designed and constructed to be consistent with local land use plans if feasible and with the avoidance and minimization measures and construction period mitigation measures discussed in Section 3.2, Transportation; Section 3.3, Air Quality and Global Climate Change; Section 3.4, Noise and Vibration; Section 3.7, Biological Resources; and Section 3.17, Cultural and Paleontological Resources. For these reasons, the impacts of mitigation are expected to be less than significant under CEQA and under NEPA.*

When the impacts of mitigation measures cannot be quantified (e.g., at a specific location, in a definite extent, at a particular time or duration, or measurable alteration of the affected resource), evaluate potential impacts using clearly described assumptions based upon reasonably foreseeable outcomes.

3.2.9 Impacts Summary

3.2.9.1 NEPA Impacts

The overall structure and content of this discussion is presented in Section 3.0.9.1, NEPA Impacts. The heading structure for this organizational scheme is shown in Section 3.2.11. Use maps, as appropriate, to show locations of significant impacts of alternatives by segment.

3.2.9.2 CEQA Significance Conclusions

The overall structure and content of this discussion is presented in Section 3.0.9.2, CEQA Significance Conclusions. The heading structure for this organizational scheme is shown in Section 3.2.11. Use maps, as appropriate, to show locations of significant unavoidable impacts of alternatives by segment.

3.2.10 Products

The RC is responsible for preparing the following products, under Authority and FRA direction, according to PMT guidance and subject to PMT quality control and assurance.

3.2.10.1 Technical Report or Appendix

In addition to the Volume 1 impacts analysis chapter, provide technical reports and Volume 2 appendices where full analysis applicable to the HSR project section requires details in excess of efficient inclusion in the EIR/EIS Volume 1 chapter. For example:

1. Volume 2, Appendix 2-E, Project Impact Avoidance and Minimization Features Analysis
2. Volume 2, Appendix 3.1-B, Regional and Local Policy Inventory
3. Volume 2, Appendix 3.2-A, Road Crossings
4. Volume 2, Appendix 3.2-B, Railroad Crossings
5. Volume 2, Appendix 3.2-C, Operations and Service Plan Summary
6. Volume 2, Appendix 3.2-D, Applicable Design Standards
7. Transportation Technical Report

3.2.10.2 Project EIR/EIS Volume 1

1. Summary/Table for EIR/EIS Executive Summary
2. Project Description—Transportation-related Components:
    a. Impact Avoidance and Minimization Features
    b. Summary Table of Impact Avoidance and Minimization Features, and Project Impacts
3. Affected Environment, Environmental Consequences, and Mitigation Measures Section: Transportation
4. Affected Environment, Environmental Consequences, and Mitigation Measures Section: Cumulative Impacts

3.2.11 Transportation EIR/EIS Outline

The RC will use the following outline for organizing content related to the transportation in Chapter 3 of the project EIR/EIS, using the heading hierarchy and format as indicated. The HSR RC shall consider the impacts of implementing mitigation measures in Section 3.2.7.

3.2 Transportation
- 3.2.1 Introduction
- 3.2.2 Laws, Regulations, and Orders
    - 3.2.2.1 Federal
    - 3.2.2.2 State
    - 3.2.2.3 Regional and Local
- 3.2.3 Regional and Local Policy Analysis
- 3.2.4 Methods for Evaluating Impacts
    - 3.2.4.1 Definition of Resource Study Area
    - 3.2.4.2 Method for Determining Significance under NEPA
    - 3.2.4.3 Method for Determining Significance under CEQA
- 3.2.5 Affected Environment
    - 3.2.5.1 Regional Transportation System
    - 3.2.5.2 Project Segment 1
        - Alternative 1
        - Alternative 2
        - Alternative 3
        - Alternative N

3.2.5.3 Project Segment 2
Alternative 1
Alternative 2
Alternative 3
Alternative N
3.2.5.4 Project Segment 3
Alternative 1
Alternative 2
Alternative 3
Alternative N
3.2.5.5 Project Segment N
Alternative 1
Alternative 2
Alternative 3
Alternative N
3.2.6 Environmental Consequences
3.2.6.1 Overview
3.2.6.2 Project Segment 1
No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.2.6.3 Project Segment 2
No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.2.6.4 Project Segment 3
No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts

Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts

3.2.6.5 Project Segment N
No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts

3.2.7 Mitigation Measures

3.2.7.1 Project Segment 1
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures

3.2.7.2 Project Segment 2
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures

3.2.7.3 Project Segment 3
Alternative 1
Construction Measures
Operations Measures

3.3 Air Quality and Global Climate Change

The methodology guidelines in this section are organized by a sequence of steps for preparing an environmental document. Section 3.3.11 provides an outline for the environmental impact report/environmental impact statement (EIR/EIS) section.

Section 3.0, General Methodology Guidance for Resource Sections, provides the methodological framework common to the evaluation of all resource areas. Section 3.19, Cumulative Impacts, provides the cumulative impact analysis methodology. Use Section 3.0 and Section 3.19 in combination with this Air Quality and Global Climate Change guidance section when developing the EIR/EIS analyses.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the resource section. Example text that illustrates the concepts and methods is shown in *italics*. The methods are organized to mirror the organization of the EIR/EIS section or chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

If there is a discrepancy between the material in this guidance and any adopted federal and state agency guideline or manual applicable to air quality or global climate change, the agency guideline or manual controls. Identify and discuss any such discrepancy with the California High-Speed Rail Authority (Authority), Federal Railroad Administration (FRA), and the Program Management Team (PMT) before deviating from this guidance.

3.3.1 Introduction

The general method for preparing an introduction for this resource section is provided in Section 3.0.1, Introduction. The following discussion presents direction specific to Air Quality and Global Climate Change.

In this section, refer to related content in other sections of the EIR/EIS that influence or are influenced by the air quality and global climate change impact analysis (i.e., public utilities, regional growth, traffic, socioeconomics) and supportive/associated technical documents. References to other documents must include citation to specific sections (by lowest heading tier, e.g., 3.X.X), not just a general reference to a chapter in the EIR/EIS.

List the program or project features that have been integrated into the HSR project and summarize the mechanism(s) by which the integrated features avoid or reduce impacts. Base the impact analysis on substantial evidence, which can be documented in detail in an appendix.

3.3.2 Laws, Regulations, and Orders

Federal, state and local laws, regulations, orders, or plans relevant to air quality and global climate change in the geographic area that is affected by the project are presented below. General National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) requirements for assessment and disclosure of environmental impacts are described in Section 3.1, Introduction, and are therefore not restated in this resource section.

3.3.2.1 Federal

The U.S. Environmental Protection Agency (USEPA) is responsible for establishing the National Ambient Air Quality Standards (NAAQS), enforcing the Clean Air Act (CAA, 42 U.S.C. § 7401), and regulating transportation-related emission sources, such as aircraft, ships, and certain types of locomotives, under the exclusive authority of the federal government. The USEPA also establishes vehicular emission standards, including those for vehicles sold in states other than California. Automobiles sold in California must meet stricter emission standards established by the California Air Resources Board (CARB).

Procedures for Considering Environmental Impacts (64 Fed. Reg. 28545)

These Federal Railroad Administration (FRA) procedures state that an EIS should consider possible impacts on air quality.

Clean Air Act (42 U.S.C. § 7401) and Conformity Rule (40 C.F.R Parts 51 and 93)

The CAA defines nonattainment areas as geographic regions designated as not meeting one or more of the NAAQS. It requires that a state implementation plan (SIP) be prepared for each nonattainment area and a maintenance plan be prepared for each former nonattainment area that subsequently demonstrated compliance with the standards. A SIP is a compilation of a state's air quality control plans and rules, approved by the EPA. Section 176(c) of the CAA provides that federal agencies cannot engage, support, or provide financial assistance for licensing, permitting, or approving any project unless the project conforms to the applicable SIP. The state's and EPA's goals are to eliminate or reduce the severity and number of violations of the NAAQS and to achieve expeditious attainment of these standards.

Pursuant to CAA Section 176(c) requirements, USEPA promulgated 40 C.F.R. Part 51W and 40 C.F.R. Part 93B, "Determining Conformity of General Federal Actions to State or Federal Implementation Plans" (§ 63214) (November 30, 1993) as amended; 75 Fed. Reg. 17253 (April 5, 2010)). These regulations, commonly referred to as the General Conformity Rule, apply to all federal actions including those by the FRA, except for those federal actions which are excluded from review (e.g., stationary source emissions) or related to transportation plans, programs, and projects under 23 U.S.C. or the Federal Transit Act, which are subject to Transportation Conformity.

In states that have an approved SIP revision adopting General Conformity regulations, 40 C.F.R. Part 51W applies; in states that do not have an approved SIP revision adopting General Conformity regulations, 40 C.F.R. Part 93B applies.

The General Conformity Rule is used to determine if federal actions meet the requirements of the CAA and the applicable SIP by ensuring that air emissions related to the action do not:

- Cause or contribute to new violations of an NAAQS
- Increase the frequency or severity of any existing violation of an NAAQS
- Delay timely attainment of an NAAQS or interim emission reduction

A conformity determination under the General Conformity Rule is required if the federal agency determines the following: *the action will occur in a nonattainment or maintenance area; that one or more specific exemptions do not apply to the action; the action is not included in the federal agency's "presumed to conform" list; the emissions from the proposed action are not within the approved emissions budget for an applicable facility; and the total direct and indirect emissions of a pollutant (or its precursors) are at or above the de minimis levels established in the General Conformity regulations* (75 Fed. Reg. 17255).

Conformity regulatory criteria are listed in 40 C.F.R. Part 93.158. An action will be determined to conform to the applicable SIP if, for each pollutant that exceeds the *de minimis* emissions level in 40 C.F.R. Part 93.153(b), or otherwise requires a conformity determination due to the total of direct and indirect emissions from the action, the action meets the requirements of 40 C.F.R. Part 93.158(c).

In addition, federal activities may not cause or contribute to new violations of air quality standards, exacerbate existing violations, or interfere with timely attainment or required interim emissions reductions toward attainment. The proposed project is subject to review under the USEPA General Conformity Rule. However, there may be some smaller highway elements of the

project that will be dealt with through the case-by-case modification of the regional transportation plan (RTP) consistent with transportation conformity.

National and State Ambient Air Quality Standards

As required by the CAA, USEPA has established NAAQS for six major air pollutants. These pollutants, known as criteria pollutants, are ozone (O_3), particulate matter (PM) (PM with an aerodynamic diameter less than or equal to 10 microns (PM_{10}) and PM with an aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$)), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead. California has also established ambient air quality standards, known as the California Ambient Air Quality Standards, which are generally more stringent than the corresponding federal standards, and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles.

Table 3.3-1 summarizes state and federal standards (as of June 2013). The primary standards have been established to protect public health. The secondary standards are intended to protect the nation's welfare and account for air pollutant impacts on soil, water, visibility, materials, vegetation, and other aspects of the general welfare.

Mobile Source Air Toxics

In addition to the criteria pollutants for which there are NAAQS, USEPA regulates mobile source air toxics (MSAT). In February 2007, USEPA finalized a rule (Control of Hazardous Air Pollutants from Mobile Sources, February 9, 2007) to reduce hazardous air pollutants from mobile sources. The rule limits the benzene content of gasoline and reduces toxic emissions from passenger vehicles and gas cans. USEPA estimates that in 2030 this rule would reduce total emissions of MSATs by 330,000 tons and volatile organic compound (VOC) emissions (precursors to O_3 and $PM_{2.5}$) by more than 1 million tons. The latest revision to this rule occurred in October 2008. This revision added specific benzene control technologies that the previous rule did not include. No federal or California ambient standards exist for MSATs. Specifically, USEPA has not established NAAQS or provided standards for hazardous air pollutants.

On February 3, 2006, the Federal Highway Administration (FHWA) released *Interim Guidance on Air Toxic Analysis in NEPA Documents*. This guidance was superseded on December 6, 2012, by FHWA's *Interim Guidance Update on Air Toxic Analysis in NEPA* (December 6, 2012). The purpose of FHWA's guidance is to advise on when and how to analyze MSATs in the NEPA environmental review process for highways and other transportation-related projects. This guidance will be followed to define the MSAT analysis for the HSR project. This guidance is considered interim since MSAT science is still evolving. As the science progresses, FHWA will update the guidance.

Greenhouse Gas Regulations

Greenhouse gas (GHG) emissions are regulated at the federal and state level. Laws and regulations, as well as plans and policies, have been adopted to address global climate change issues. Key federal regulations relevant to the project are summarized below.

On September 22, 2009, USEPA published the Final Rule that requires mandatory reporting of GHG emissions from large sources in the U.S. (EPA 2010a). The gases covered by the Final Rule are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), sulfur hexafluoride (SF_6), and other fluorinated gases, including nitrogen trifluoride (NF_3) and hydrofluorinated ethers (HFE). Currently, this is not a transportation-related regulation and, therefore, does not apply to this project. However, the methodology developed as part of this regulation is helpful in identifying potential GHG emissions.

On December 7, 2009, the *Final Endangerment and Cause or Contribute Findings for Greenhouse Gases* under Section 202(a) of the CAA was signed by the USEPA administrator. The endanger-ment finding states that current and projected concentrations of the six key well-mixed GHGs in

the atmosphere—CO_2, CH_4, N_2O, HFC, PFC, and SF_6—threaten the public health and welfare of current and future generations. Furthermore, it states that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare (USEPA 2010b).

Table 3.3-1 State and Federal Ambient Air Quality Standards

Ambient Air Quality Standards						
Pollutant	Averaging Time	California Standards [1]		National Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3)	1 Hour	0.09 ppm (180 $\mu g/m^3$)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 $\mu g/m^3$)		0.075 ppm (147 $\mu g/m^3$)		
Respirable Particulate Matter (PM10)[8]	24 Hour	50 $\mu g/m^3$	Gravimetric or Beta Attenuation	150 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 $\mu g/m^3$		—		
Fine Particulate Matter (PM2.5)[8]	24 Hour	—	—	35 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 $\mu g/m^3$	Gravimetric or Beta Attenuation	12.0 $\mu g/m^3$	15 $\mu g/m^3$	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[9]	1 Hour	0.18 ppm (339 $\mu g/m^3$)	Gas Phase Chemiluminescence	100 ppb (188 $\mu g/m^3$)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 $\mu g/m^3$)		0.053 ppm (100 $\mu g/m^3$)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[10]	1 Hour	0.25 ppm (655 $\mu g/m^3$)	Ultraviolet Fluorescence	75 ppb (196 $\mu g/m^3$)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 $\mu g/m^3$)	
	24 Hour	0.04 ppm (105 $\mu g/m^3$)		0.14 ppm (for certain areas)[10]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[10]	—	
Lead[11,12]	30 Day Average	1.5 $\mu g/m^3$	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 $\mu g/m^3$ (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 $\mu g/m^3$		
Visibility Reducing Particles[13]	8 Hour	See footnote 13	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 $\mu g/m^3$	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 $\mu g/m^3$)	Ultraviolet Fluorescence			
Vinyl Chloride[11]	24 Hour	0.01 ppm (26 $\mu g/m^3$)	Gas Chromatography			

See footnotes on next page …

Table 3.3-1 State and Federal Ambient Air Quality Standards (continued)

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7. Reference method as described by the U.S. EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the U.S. EPA.

8. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM10 standards (primary and secondary) of 150 $\mu g/m^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

9. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

10. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

    Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

11. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

12. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

13. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

For more information please call ARB-PIO at (916) 322-2990 **California Air Resources Board (6/4/13)**

Based on the endangerment finding, USEPA revised vehicle emission standards. USEPA and the National Highway Traffic Safety Administration (NHTSA) updated the Corporate Average Fuel Economy fuel standards on October 15, 2012 (77 Fed. Reg. 62623), requiring substantial improvements in fuel economy for all vehicles sold in the U.S. The new standards apply to new passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2017 through 2025. The USEPA GHG standards require that these vehicles meet an estimated combined average emissions level of 163 grams of CO_2 per mile in model year 2025, which would be equivalent to 54.5 miles per gallon if the automotive industry were to meet this CO_2 level entirely through fuel economy improvements.

On September 15, 2011, USEPA and NHTSA issued a final rule of *Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles* (76 Fed. Reg. 7106). This final rule is tailored to each of three regulatory categories of heavy-duty vehicles—combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles. USEPA and NHTSA estimated that the new standards in this rule will reduce CO_2 emissions by approximately 270 million metric tons (MMT) and save 530 million barrels of oil over the life of vehicles sold during the 2014 through 2018 model years.

In January 2012, CARB approved a vehicle emission control program for model years 2017 through 2025. This is called the Advanced Clean Cars Program. On August 28, 2012, USEPA and NHTSA issued a joint final rulemaking to establish 2017 through 2025 GHG emissions and Corporate Average Fuel Economy standards. To further California's support of the national program to regulate emissions, CARB submitted a proposal that would allow automobile manufacturer compliance with EPA's requirements to show compliance with California's requirements for the same model years. The Final Rulemaking Package was filed on December 6, 2012, and the final rulemaking became effective December 31, 2012.

Greenhouse Gas Guidance

On February 18, 2010, CEQ released draft guidance on the consideration of GHG in NEPA documents for federal actions. The draft guidelines include a presumptive threshold of 25,000 metric tons of carbon dioxide equivalent (CO_2e) emissions from a proposed action to trigger a quantitative analysis. CEQ has not established when GHG emissions are “significant” for NEPA purposes, but rather poses that question to the public (CEQ 2010).

3.3.2.2 State

California Clean Air Act

The California Clean Air Act (CCAA) requires that nonattainment areas achieve and maintain the health-based California Ambient Air Quality Standards (CAAQS) by the earliest practicable date. CCAA is administered by CARB at the state level and by local air quality management districts at the regional level. Air districts are required to develop plans and control programs for attaining the state standards.

CARB is responsible for ensuring implementation of the CCAA, meeting state requirements of the federal CAA, and establishing the state ambient air quality standards. CARB is also responsible for setting emission standards for vehicles sold in California and for other emission sources, such as consumer products and certain off-road equipment. CARB also establishes passenger vehicle fuel specifications.

Asbestos Control Measures

CARB has adopted two airborne toxic control measures for controlling naturally occurring asbestos—the *Asbestos Airborne Toxic Control Measure for Surfacing Applications* (California Code of Regulations, Title 17, Section 93106) and the *Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations* (California Code of Regulations, Title 17, Section 93105). Also, USEPA is responsible for enforcing regulations

relating to asbestos renovations and demolitions; however, USEPA can delegate this authority to state and local agencies. CARB and local air districts have been delegated authority to enforce the Federal National Emission Standards for Hazardous Air Pollutants regulations for asbestos.

Greenhouse Gas Regulations

California has taken proactive steps, briefly described below, to address the issues associated with GHG emissions and climate change.

Assembly Bill 1493

In 2002, with the passage of Assembly Bill (AB) 1493, California launched an innovative and proactive approach to dealing with GHG emissions and climate change at the state level. AB 1493 requires CARB to develop and implement regulations to reduce automobile and light-truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the model year 2009. Although litigation challenged these regulations and USEPA initially denied California's related request for a waiver, the waiver request was granted (EPA 2010c).

Executive Order S-3-05

On June 1, 2005, Governor Arnold Schwarzenegger signed Executive Order (EO) S-3-05. The goal of this EO is to reduce California's GHG emissions to year 2000 levels by 2010; 1990 levels by 2020; and 80 percent below the 1990 levels by 2050. EO S-3-05 also calls for California EPA (Cal-EPA) to prepare biennial science reports on the potential impact of continued global warming on certain sectors of the California economy. As a result of the scientific analysis presented in these biennial reports, a comprehensive Climate Adaptation Strategy was released in December 2009 following extensive interagency coordination and stakeholder input. The latest of these reports, *Climate Action Team Biennial Report*, was published December 2010 (Cal-EPA 2010).

Assembly Bill 32

In 2006, the goal of EO S-03-05 was further reinforced with the passage of AB 32 (Chapter 488, Statutes of 2006), the *Global Warming Solutions Act of 2006*. AB 32 sets overall GHG emissions reduction goals and mandates that CARB create a plan, which includes market mechanisms, and implement rules to achieve *real, quantifiable, cost-effective reductions of GHGs*. EO S-20-06 further directs state agencies to begin implementing AB 32, including the recommendations made by the state's Climate Action Team.

Among AB 32's specific requirements are the following:

- CARB will prepare and approve a scoping plan for achieving the maximum technologically feasible and cost-effective reductions in GHG emissions from sources or categories of sources of GHGs by 2020 (Health and Safety Code (HSC) 38561). The scoping plan, approved by CARB on December 12, 2008 and updated in 2014, provides the outline for future actions to reduce GHG emissions in California via regulations, market mechanisms, and other measures.
- The scoping plan includes the implementation of high-speed rail as a GHG reduction measure, estimating a 2020 reduction of 1 MMT of CO_2e.
- Identify the statewide level of greenhouse gas emissions in 1990 to serve as the emissions limit to be achieved by 2020 (HSC 38550). In December 2007, CARB approved the 2020 emission limit of 427 MMT CO_2e of GHG.
- Adopt a regulation requiring the mandatory reporting of greenhouse gas emissions (HSC 38530). In December 2007, CARB adopted a regulation requiring the largest industrial sources to report and verify their GHG emissions. The reporting regulation serves as a solid foundation to determine GHG emissions and track future changes in emission levels.

Executive Order S-01-07

With EO S-01-07, Governor Schwarzenegger set forth the low carbon fuel standard for California. Under this EO, the carbon intensity of California's transportation fuels is to be reduced by at least 10 percent by 2020.

Sustainable Communities and Climate Protection Act of 2008 (SB 375)

The *Sustainable Communities and Climate Protection Act of 2008* (Chapter 728, Statutes of 2008), signed into law by the governor on September 30, 2008, became effective January 1, 2009. This law requires CARB to develop regional reduction targets for GHG emissions and prompts the creation of regional land use and transportation plans to reduce emissions from passenger vehicle use throughout the state. The targets apply to the regions in the state covered by California's 18 metropolitan planning organizations (MPO). The 18 MPOs have been tasked with creating the regional land use and transportation plans called "sustainable community strategies" (SCS). The MPOs are required to develop the SCS through integrated land use and transportation planning and to demonstrate an ability to attain the proposed reduction targets by 2020 and 2035. This would be accomplished through either the financially constrained SCS as part of its RTP or through an unconstrained alternative planning strategy. If regions develop integrated land use, housing, and transportation plans that meet the SB 375 targets, new projects in these regions can be relieved of certain review requirements of CEQA.

Pursuant to SB 375, CARB appointed a Regional Targets Advisory Committee (RTAC) on January 23, 2009, to provide recommendations on factors to be considered and methodologies to be used in CARB's target-setting process. The RTAC was required to provide its recommendations in a report to CARB by September 30, 2009. The report included relevant issues, such as data needs, modeling techniques, growth forecasts, jobs-housing balance, interregional travel, various land use/transportation issues affecting GHG emissions, and overall issues relating to setting these targets. CARB adopted the final targets on September 23, 2010. CARB must update the regional targets every 8 years (or 4 years if it so chooses) consistent with each MPO update of its RTP.

3.3.2.3 Regional and Local

Compile a complete inventory of adopted local and regional plans, ordinances, or guidelines related to air quality and global climate change. A tabular format similar to that used in the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014), or more recent HSR project EIR/EIS, may be used to organize and concisely report this information.

- Air Quality Management District Indirect Source Reviews and other regulations
- Regional transportation agency and metropolitan planning organization regulations

This information will become part of Volume 2 Appendix 3.1-B Regional and Local Policy Inventory.

3.3.3 Regional and Local Policy Analysis

The overall structure of this discussion is presented in Section 3.0.3, Regional and Local Policy Analysis. As described in more detail in subsection 3.0.3.2, this analysis will describe any inconsistency or conflict with adopted regional or local policies and implementation of the HSR project.

3.3.4 Methods for Evaluating Impacts

The overall structure and content of this discussion is presented in Section 3.0.4, Methods for Evaluating Impacts. Evaluation of impacts on air quality and global climate change is a requirement of the CAA and CEQA, as well as NEPA. Each project EIR/EIS shall list all of the modeling inputs and values used to determine potential air quality and climate change impacts,

based on local, state, and federal guidelines. Documentation will include but is not limited to: the Clean Air Act Amendments, General Conformity Guidelines, USEPA Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas, CARB regulations and guidance, and any other applicable documentation.

In addition, the project EIR/EIS shall describe prior and on-going efforts to avoid violations of the NAAQS and CAAQS and the air quality attainment goals of each specific study area. This section identifies the pollutants for analysis, and describes the methodology for developing the resource study area (RSA) and for evaluating effects under CEQA and NEPA. Subsequent sections in this methodology provide direction for the design of mitigation measures and the structure for presenting content related to air quality and global climate change in the EIR/EIS documents.

3.3.4.1 Pollutants for Analysis

Three general classes of air pollutants are of concern for this project—criteria pollutants, toxic air contaminants (TAC), and GHGs. Criteria pollutants are those for which the USEPA and the State of California have set ambient air quality standards or that are chemical precursors to compounds for which ambient standards have been set. TACs of concern for the proposed project are seven MSATs identified by USEPA as having significant contributions from mobile sources—acrolein, benzene, 1,3-butadiene, diesel particulate matter and diesel exhaust organic gases, formaldehyde, naphthalene, and polycyclic organic matter. GHGs are gaseous compounds that limit the transmission of radiated heat from the earth's surface to the atmosphere. GHG includes CO_2, CH_4, N_2O, HFC, PFC, SF_6, and other fluorinated gases, including NF_3 and HFE.

Criteria Pollutants

For these pollutants, both federal and state ambient air quality standards have been established to protect public health and welfare. The following sections briefly describe each pollutant.

Ozone

CARB inventories two classes of hydrocarbons—total organic gases and reactive organic gases (ROG). ROGs have relatively high photochemical reactivity. The principal nonreactive hydrocarbon is methane, which is also a GHG. The major source of ROG is the incomplete combustion of fossil fuels in internal combustion engines. Other sources of ROGs include the evaporative emissions associated with the use of paints and solvents, the application of asphalt paving, and the use of household consumer products. Adverse impacts on human health are not caused directly by ROG, but rather by reactions of ROG that form secondary pollutants. ROGs are also transformed into organic aerosols in the atmosphere, contributing to higher levels of fine particulate matter and lower visibility. CARB uses the term ROG for air quality analysis, and ROG has the same definition as the federal term VOC. For the air quality and global climate change analysis, ROG is assumed to be equivalent to VOC.

> **Definition of O_3**
>
> O_3 is a colorless toxic gas found in the earth's upper and lower atmospheric levels. In the upper atmosphere, O_3 is naturally occurring and helps to prevent the sun's harmful ultraviolet rays from reaching the earth. In the lower atmosphere, O_3 is man-made. Although O_3 is not directly emitted, it forms in the lower atmosphere through a chemical reaction between hydrocarbons and oxides of nitrogen, also referred to as VOC and NO_x, which are emitted from industrial sources and from automobiles.

Substantial O_3 formations generally require a stable atmosphere with strong sunlight; thus, high levels of O_3 are generally a concern in the summer. O_3 is the main ingredient of smog. O_3 enters the bloodstream through the respiratory system and interferes with the transfer of oxygen, depriving sensitive tissues in the heart and brain of oxygen. O_3 also damages vegetation by inhibiting its growth. The air quality and global climate change analysis examines the impacts of changes in VOC and nitrogen oxides (NO_x) emissions for the proposed project on a regional and statewide level.

Particulate Matter

Particulate pollution is composed of solid particles or liquid droplets small enough to remain suspended in the air. In general, particulate pollution can include dust, soot, and smoke. These can be irritating but usually are not toxic. However, particulate pollution can include bits of solid or liquid substances that are highly toxic. Of particular concern are PM_{10} and $PM_{2.5}$.

Major sources of PM_{10} include motor vehicles; wood-burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires, brush, and waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions. Suspended particulates produce haze and reduce visibility. Data collected through numerous nationwide studies indicate that most of the PM_{10} comes from fugitive dust, wind erosion, and agricultural and forestry sources.

A small portion of particulate matter is the product of fuel combustion processes. In the case of $PM_{2.5}$, the combustion of fossil fuels accounts for a significant portion of this pollutant. The main health impact of airborne particulate matter is on the respiratory system. $PM_{2.5}$ results from fuel combustion (from motor vehicles, power generation, and industrial facilities), residential fireplaces, and wood stoves. In addition, $PM_{2.5}$ can form in the atmosphere from gases such as SO_2, NO_x, and VOC. Like PM_{10}, $PM_{2.5}$ can penetrate the human respiratory system's natural defenses and damage the respiratory tract when inhaled. Whereas PM_{10} tends to collect in the upper portion of the respiratory system, $PM_{2.5}$ can penetrate deeper into the lungs and damage lung tissues. The effects of PM_{10} and $PM_{2.5}$ emissions for the project are examined on a localized—or microscale—basis, a regional basis, and a statewide basis.

> **Definition of PM_{10} and $PM_{2.5}$**
>
> PM_{10} refers to particulate matter less than 10 microns in diameter, about one seventh the thickness of a human hair. Particulate matter pollution consists of small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter also forms when gases emitted from motor vehicles undergo chemical reactions in the atmosphere.
>
> $PM_{2.5}$ is a subset of PM_{10} and refers to particulates that are 2.5 microns, or less, in diameter, roughly 1/28th the diameter of a human hair.

Carbon Monoxide

In cities, 85 to 95 percent of all CO emissions may come from motor vehicle exhaust. Prolonged exposure to high levels of CO can cause headaches, drowsiness, loss of equilibrium, or heart disease. CO levels are generally highest in the colder months when inversion conditions (when warmer air traps colder air near the ground) are more frequent.

CO concentrations can vary greatly over relatively short distances. Relatively high concentrations of CO are typically found near congested intersections, along heavily used roadways carrying slow-moving traffic, and in areas where atmospheric dispersion is inhibited by urban “street canyon” conditions. Consequently, CO concentrations must be predicted on a microscale basis.

> **Definition of CO**
>
> CO is a colorless gas that interferes with the transfer of oxygen to the brain. CO emits almost exclusively from the incomplete combustion of fossil fuels. On-road motor-vehicle exhaust is the primary source of CO.

Nitrogen Dioxide

Nitrogen monoxide, also known as nitric oxide (NO) and NO_2, collectively referred to as NO_x, are major contributors to O_3. NO_2 also contributes to the formation of PM_{10}. At atmospheric concentrations, NO_2 is only potentially irritating. In high concentrations, the result is a brownish-red cast to the atmosphere and reduced visibility. There is some indication of a relationship between NO_2 and chronic pulmonary fibrosis. In addition, an increase in bronchitis in children (2 and 3 years old) has been observed at concentrations below 0.3 parts per million (ppm).

Lead

Lead levels from mobile sources in the urban environment have decreased largely due to the federally mandated switch to lead-free gasoline, and they are expected to continually decrease. An analysis of lead emissions from transportation projects is therefore not warranted.

Sulfur Dioxide

SO_2 can cause acute respiratory symptoms and diminished ventilation in children. SO_2 can also yellow plant leaves and corrode iron and steel. Although diesel-fueled heavy duty vehicles emit SO_2, transportation sources are not considered by USEPA (and other regulatory agencies) to be large sources of this pollutant. Therefore, an analysis of the impacts of SO_2 emissions from transportation projects is usually not warranted. However, an analysis of the impacts of SO_2 emissions was conducted for this project.

Toxic Air Contaminants

California law defines a TAC as an air pollutant that "may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health." USEPA uses the term "hazardous air pollutant" in a similar sense. Controlling air toxic emissions became a national priority with the passage of the CAA, whereby Congress mandated that USEPA regulate 188 air toxics, also known as hazardous air pollutants. Toxic air contaminants can be emitted from stationary and mobile sources.

Stationary sources of TACs from HSR operations would include use of solvent-based materials (cleaners and coatings) and combustion of fossil fuel in boilers, heaters, and ovens at maintenance facilities. Although the HSRs would not emit TACs, MSATs would be associated with the project chiefly through motor vehicle traffic to and from the HSR stations.

For MSAT, USEPA has assessed the expansive list of 188 air toxics in its latest rule on the Control of Hazardous Air Pollutants from Mobile Sources, and identified 93 compounds emitted from mobile sources that are listed in its Integrated Risk Information System. USEPA identified seven compounds with significant contributions from mobile sources that are among the national- and regional-scale cancer risk drivers from its 1999 National Air Toxics Assessment. These seven compounds are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. This list, however, is subject to change and may be adjusted in consideration of future USEPA rules.

Greenhouse Gases

GHGs trap heat in the atmosphere, keeping the earth's surface warmer than it otherwise would be. According to National Oceanic and Atmospheric Administration (NOAA) and National Aeronautics and Space Administration data, the earth's average surface temperature has increased by 1.2 to 1.4°F in the last 100 years. Eleven of the last 12 years rank among the 12 warmest years on record (since 1850), with the warmest 2 years being 2010 and 2005. Most of the warming in recent decades is likely the result of human activities. Other aspects of the climate are also changing, such as rainfall patterns, snow and ice cover, and sea level.

> **Definition of Greenhouse Gases**
>
> Greenhouse gas (GHG) is any gas that absorbs infrared radiation in the atmosphere. GHG include, but are not limited to, water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrochlorofluorocarbons (HCFCs), ozone (O_3), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).GHGs contribute to the global warming trend, a regional and ultimately a worldwide concern. What was once a natural phenomenon of climate has been changing because of human activities, resulting in an increase in CO_2.

Some GHGs, such as CO_2, occur naturally and are emitted to the atmosphere through both natural processes and human activities. Other GHGs (e.g., fluorinated gases) are created and emitted solely through human activities. GHGs differ in their ability to trap heat. For example, 1 ton of

emissions of CO_2 has a different effect than 1 ton of emissions of CH_4. To compare emissions of different GHGs, inventory compilers use a weighting factor called a Global Warming Potential (GWP). To use a GWP, the heat-trapping ability of 1 metric ton (1,000 kilograms) of CO_2 is taken as the standard, and emissions are expressed in terms of CO_2 equivalent, but can also be expressed in terms of carbon equivalent. Therefore, the GWP of CO_2 is 1. The GWP of CH_4 is 21, whereas the GWP of N_2O is 310. The principal GHGs that enter the atmosphere because of human activities include CO_2, CH_4, N_2O, HCFCs, HFCs, PFCs, and SF_6. Because of the global nature of GHG emissions and the nature of the electrical grid system, GHG was examined on a statewide level.

3.3.4.2 Definition of Resource Study Area

The RSA is the area in which all environmental investigations specific to air quality and global climate change are conducted to determine the resource characteristics and potential impacts of the project segment. The factors making up the RSA and the description of the elements comprising the RSA (including an illustrative figure) are provided in Section 3.0.4.1, Definition of Resource Study Area, and Section 3.0.4.2, Methodology for Impact Analysis.

The boundaries of the RSA for air quality and global climate change extend beyond the project footprint. The local air quality impact analysis focuses on the effects of criteria pollutant and MSAT emissions from both the construction and operations of the project on nearby sensitive receivers. Sensitive receivers include residential dwellings, schools, churches, hospitals and parks. The RSA has been determined based on typical screening distances, based on USEPA and CARB modeling guidance and project-specific factors of the HSR project (e.g., location of the maintenance facilities and stations).

The regional air quality analysis and the global climate change analysis evaluate the project's impact on criteria pollutants and GHGs on a statewide basis. GHGs are estimated on a statewide basis because their impacts are not localized or regional; this is due to their rapid dispersion into the global atmosphere. Furthermore, the estimation of GHGs on a statewide basis provides a comprehensive study area for the analysis of the HSR's impact on statewide vehicle miles traveled (VMT), aircraft travel, and energy use consistent with State of California planning.

The RSA for cumulative effects will be a broader area depending on the project section and will consider adjacent HSR project sections to ensure a broad consideration of impacts on a more regional and statewide basis. See Section 3.19, Methodology for Cumulative Impacts, for a more detailed discussion.

Table 3.3-2 presents the required information sources and baseline metrics to help define the RSA.

Table 3.3-2 Environmental Resource Study Area Information

Required Information	Resource Study Area
▪ Project description—HSR system, linear and sited facilities, stations, operations, ancillary improvements ▪ Regional—Attainment plans, TIP status ▪ Local—Local hotspots, areas of concern, sensitive receptors ▪ Climate change—federal, state, and local guidance	▪ Regional—Air basins traversed by alternative HSR corridors and No Project highways and airports ▪ Local—Project footprint plus 1,000 feet around stations (localized study area) and any affected intersections projected to operate at level of service (LOS) E or F; RSA varies by activities at the HMF and MOW facilities ▪ Climate change—State of California (subject to further review)

3.3.4.3 Methodology for Impact Analysis

Group and consolidate information and discussion in the EIR/EIS to effectively present content to the lay audience (e.g., by distinct resource characteristic or component, such as local operational impacts, regional impacts, and construction impacts). Present detailed information on local construction and operational air quality impacts, as well as regional air quality and statewide GHG impacts as a result of the proposed HSR alternatives in the EIR/EIS Volume 2 appendix associated with this resource, with specific reference to the appendix provided in the Chapter 3 topical subsection to help the reader navigate between volumes.

Begin analysis of impacts with consideration of impact avoidance and minimization features that are incorporated into the project in Section 2.5.2, HSR Build Alternatives, and evaluated in Volume 2, Appendix 2-E. Account for implementation of design features or best management practices, such as use of low-VOC paint that contains less than 10 percent of VOC contents. (VOC, 10%). A super-compliant or clean air paint that has a lower VOC content than those required by South Coast Air Quality Management District Rule 1113 will also be used when available.

Refer to the summary table of impact avoidance and minimization features, and explain how particular features avoid impacts or ensure less-than-significant impacts to Air Quality and Global Climate Change.

Analyze direct and indirect impacts related to air quality and global climate change through quantitative analysis and, where necessary, with qualitative analysis. Analyze impacts that may occur during construction and operation of the HSR system (*Note:* the analytical results for construction impacts and operations impacts are presented separately in the EIR/EIS). Apply the same impact thresholds in both project timeframes. Table 3.3-3 identifies key topics and issues to be considered in the air quality and global climate change analysis.

Table 3.3-3 Key Topics and Issues for Air Quality and Global Climate Change Impacts

Key Topics	Issues to Evaluate
Construction activities associated with alignment station and parking facilities with potential for impacts to air quality and global climate change.	▪ On-site combustion emissions ▪ On-site fugitive emissions ▪ Off-site hauling emissions ▪ Concrete batch plants ▪ Fugitive dust from on-site and off-site activities
Operational impacts resulting from ongoing activities of the HSR system including transportation activities associated with station and parking operations serving the HSR project.	▪ Localized criteria pollutants ▪ Localized mobile source air toxics ▪ Regional criteria pollutants ▪ Regional greenhouse gas emissions
Project-level conformity	▪ Potential for localized CO, PM_{10}, or $PM_{2.5}$ hotspots from operation at intersections and stations ▪ Hotspots based on transportation conformity regulation

Table 3.3-3 Key Topics and Issues for Air Quality and Global Climate Change Impacts (continued)

Key Topics	Issues to Evaluate
Regional operations	▪ Potential for regional operation emissions of alternatives to exceed allowable regional emission limits, including diesel-fueled buses that feed into the HSR stations ▪ Potential to conflict with or obstruct implementation of the applicable air quality plan ▪ Potential to result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)
Regional construction	▪ Potential for regional construction emissions of alternatives to exceed regional emissions significance thresholds ▪ Potential to conflict with or obstruct implementation of the applicable air quality plan ▪ Potential to result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)
Local operations	▪ Potential for localized operation impacts at intersections and stations ▪ Violation of any air quality standard or substantial contribution to an existing or projected air quality violation ▪ Potential to expose sensitive receptors to substantial pollutant concentrations
Local construction	▪ Potential for localized construction impacts at intersections and stations ▪ Violation of any air quality standard or potential to contribute substantially to an existing or projected air quality violation ▪ Potential to expose sensitive receptors to substantial pollutant concentrations
Greenhouse gas emissions	▪ Potential for the project to increase or decrease GHG emissions ▪ Potential conflict with the state requirements for reducing GHG emissions in California ▪ Exceedance of interim significance thresholds for GHGs as established by CARB ▪ Generation of GHG emissions, either directly or indirectly, that may have a significant impact on the environment ▪ Potential conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of GHGs (subject to update and will be discussed with PMT)
Air toxics	▪ Potential for construction and operations of the alternatives to result in generation of substantial air toxic emissions ▪ Potential to expose sensitive receptors to substantial pollutant concentrations

Base the analysis on a review of available reports and data (including federal and state statutes, resource agency, local, and regional agency policies and ordinances), discussions with agency representatives in the region, field investigation, modeling (where applicable), and professional judgment. Develop GIS databases for each project segment. Develop all GIS data (1) as part of project design or (2) from available federal, state, and local sources. Provide sufficient detail to allow complete analysis of the anticipated design of the completed project or of reasonable assumptions for project implementation, including location of maintenance facilities and stations, delineation of air basins, etc. Focus the analysis on the project's potential to alter existing conditions of the affected sensitive receivers in the RSA(s). Identify where permit applications will be needed and provide analysis to support future permit review.

The methodology used to evaluate air quality and global climate change impacts is generally based on the CAA and the CCAA, as well as the applicable federal, state and local guidance presented in Section 3.3.2. Include a review of the data and impact analyses in the other sections prepared for the EIR/EIS, including public utilities, cumulative impacts, regional growth, and traffic. For all impacts, apply the following methods to determine impact significance under NEPA and CEQA.

The Program Management Team (PMT) will:

- In general, review analyses conducted by regional teams to ensure overall project consistency.
- Act as a contact point for state and local agencies as well as for regional teams.
- Quantify criteria pollutant and GHG emissions for each project alternative using relevant VMT data and project-approved version of EMFAC emissions factors on a statewide and county-level basis. Conduct analysis for opening year (when project is expected to be functional—varies by section) and design year (the horizon year for traffic analyses). Calculate emission rates based on the latest EPA/CARB approved emission factor program, currently EMFAC2014.
- Quantify statewide high speed rail and aircraft emissions using statewide projections of daily mileage and operational (landings/take-offs) and applicable emission factors from EPA's *Emission Factors for Locomotives* (EPA420-F-97-051) and the Federal Aviation Administration's (FAA) *Aviation Environment Design Tool* for aircraft. If data is available, break down aircraft emissions by region and supply to the appropriate regional teams. It is currently assumed that no changes in existing train service will occur; therefore, no emission burdens will be calculated for this transportation element. Also compare to the emission inventories developed by CARB and the applicable air quality management district.
- Perform statewide GHG analysis, taking into account VMT, aircraft, and power requirements of HSR, using statewide energy information from energy PM.
- Estimate air quality emissions effects on a statewide level due to HSR power requirements.
- Review construction emissions estimates produced by the regional team using the equipment inventory method (see description below).
- If applicable, review the analysis of air quality impacts of heavy maintenance facilities.
- Review General Conformity documentation produced by the regional team prior to its submittal to FRA and the Attorney General.

The HSR Section RC will:

- Contact local agencies before analysis is initiated to ensure that local requirements are understood. Consult with the PMT prior to contacting the local agencies.

- Describe the emission sources included in the analysis (e.g., HSR operations, traffic around stations and electrical generation for the system, see above).
- Explain requirements, including SIP and TIP status.
- Discuss statewide emission burden projections as supplied by CARB.
- Prepare discussion of GHG emissions and discuss potential impacts taking into consideration the *Climate Action Program at Caltrans* (December 2006) (www.dot.ca.gov/hq/tpp/offices/ogm/key_reports_files/State_Wide_Strategy/Caltrans_Climate_Action_Program.pdf) and the *California Climate Action Registry, General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1 (January 2009)* (www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf).
- Compare emissions to the revisions to Appendix G of the CEQA Guidelines. As this is an evolving field, regularly check for updates of applicable methodologies, regulations, and standards.
- Use *FHWA Interim Guidance Update on Air Toxic Analysis* in NEPA documents to determine MSAT analysis methodology. Evaluate potential air toxic impacts by conducting a screening-level analysis followed by a more detailed analysis (i.e., dispersion modeling), if necessary. For the screening-level analysis, review the proposed project's conceptual engineering plans and profiles and project description to identify any new or modified air toxic emissions sources. If it is determined that the proposed project would introduce a new source, or modify an existing air toxic emissions source, identify downwind sensitive receptor locations and conduct site-specific dispersion modeling to determine proposed project impacts (www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/aqintguidmem.cfm).
- For CO, PM_{10}, or $PM_{2.5}$ nonattainment or maintenance areas, evaluate alternatives for potential for CO, PM_{10}, or $PM_{2.5}$ hotspots. Traffic data used for this analysis should include indirect impacts of parking-induced VMT.
- Use air quality screening methods for areas affected by stations and facilities, as prescribed in local and regional air districts (consult with local and regional districts), CARB, Caltrans, EPA, and FHWA documents, to determine which areas have the potential to experience significant air quality impacts due to the project (www.dot.ca.gov/ser/vol1/sec3/physical/ch11air/chap11.htm).
  - Conduct screening level analysis at locations selected because of high traffic volumes or levels of congestion and sensitive land uses around stations
  - Evaluate local intersections (identified above) based on Caltrans CO Protocol and local air district criteria
  - Evaluate project-level transportation conformity requirements under the Conformity Regulations
    - In $PM_{2.5}$ or PM_{10} nonattainment or maintenance areas, evaluate localized PM_{10}/$PM_{2.5}$ hotspots using EPA/FHWA guidelines, EPA/FHWA Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas (December 2010), as applicable (www.dot.ca.gov/hq/env/air/pages/qualpm.htm)
    - In CO nonattainment or maintenance areas, evaluate local intersections (identified above) and parking facilities based on the most stringent guidelines, whether they are the Caltrans CO Protocol or local area guidelines. Use the latest EPA/CARB approved emission factor program, currently EMFAC2011, to generate emission rates.

- Correlate receptor selection with Environmental Justice analysis to ensure that all potentially sensitive receptors at potential hotspots are evaluated.
- Analyze construction impacts:
  - Using the construction sequence provided by the regional teams and reviewed by the PMT's construction and schedule experts, calculate the regional construction emissions using the equipment inventory method. Include construction schedule, construction equipment (including horsepower, dirt handling quantities, utilization rates for equipment), and hours of operation. Calculate construction emissions on a monthly basis and on an annual basis. Calculate construction emissions for the following types of emission sources:
    - Combustion emissions—construction equipment, mobile source from worker trips, haul truck trips. Calculate mobile source emission burdens from worker trips and truck trips using VMT estimates and appropriate emission factors from EMFAC. Calculate construction equipment emissions based on OFFROAD emissions generated by CARB.
    - Fugitive emissions—site disturbance activities, off gassing from asphalt paving, and the application of architectural coatings.
- Conduct a two-step analysis for local construction impacts. Construction will likely be temporary and transitory. First, screen local sensitive receptors to determine if there would be impacts because of the distance to the receptor and anticipated length of local construction activity. If there is a potential for impact to occur, perform a quantitative assessment at those locations utilizing a dispersion model (AMS/EPA—Regulatory Model (AERMOD)). Compare the results with the short-term ambient air quality standards for PM_{10}/$PM_{2.5}$ and oxides of nitrogen.
- For this type of project, objectionable odor impacts are not expected to be an issue and are discussed qualitatively.
- If applicable, analyze the air quality impacts of heavy maintenance facilities.
- Discuss whether the project conforms to the adopted RTP and SIP.
- Discuss emission burdens calculated in terms of area attainment status and requirements under general conformity.
- Prepare General Conformity documentation for review by FRA and the Attorney General.

Baselines

The substantial differences in timing and circumstances associated with HSR construction, initiation of HSR operations, interim and full HSR operations, requires use of progressive baselines for thorough analysis of potential air quality and greenhouse gas impacts. This approach will capture changes in air quality and greenhouse gas conditions, and emissions resulting from planned traffic improvement projects and the different stages of HSR operation. For example, RTPs include funded transportation projects that are programmed to be constructed by 2040, or subsequent horizon years in later RTPs. These projects are reasonably expected be in place before the HSR project reaches maturity (i.e., the point/year at which HSR-related transportation generation reaches its maximum). An accurate prediction of expected conditions for evaluation of the HSR project's air quality and greenhouse gas impacts must consider these planned transportation improvements in the underlying background conditions to which HSR project effects would be added.

Similar to, and in coordination with the baseline approach described in Section 3.2.4.2 for the transportation impact analysis, use four potential baselines for assessing project impacts:

1. Environmental Baseline #1: Existing + Construction—Impacts could include any road closures or lane reconfigurations that will be implemented during construction. These could be temporary impacts associated with construction, as well as permanent impacts affecting VMT through the altered roadway network.
2. Environmental Baseline #2: Date of Project Implementation—The analysis will consider estimated daily project ridership levels at the date of HSR segment implementation. These estimates will be consistent with information in the most recently adopted HSR Business Plan and will include the years of implementation for the following phases: Initial Operating Segment, Bay to Basin, and Phase 1. The methodology will use the year that trains will begin operation on that segment (according to latest adopted Business Plan; e.g. for the 2014 Business Plan: 2022 for Initial Operating Segment, 2027 for Bay to Basin, 2029 for Phase 1).
3. Environmental Baseline #3: Interim Terminus Stations—This will reflect maximum ridership at a timeframe between the date of implementation and horizon year. A separate analysis of impacts at interim terminus stations shall be included, if applicable, for Authority consideration in consultation with the FRA and station cities. The analysis shall determine the magnitude, severity, and duration of interim impacts, and potential mitigation options.
4. Environmental Baseline #4: Completion of Phase 1 (Horizon year) with full ridership—The timeframe for this baseline is indexed to the RTP(s) applicable to the HSR section (per NEPA practice) and the adopted HSR Business Plan. Current horizon year for HSR is 2040, but the horizon year will advance as RTPs and the HSR Business Plan are updated. The analysis may also consider completion of Phase 2 in future studies, as warranted by Authority business planning and as directed by the Authority.

Structure the impact analysis to allow incremental assessment of impacts related to road closures or lane reconfigurations implemented during construction, and HSR station traffic and VMT at initiation of rail service. Prepare a summary matrix that categorizes impacts from all four baseline analyses, primarily by construction impacts and operations impacts, and secondarily by interim impacts and permanent impacts.

Present details in *Appendix 3.3-A, Air Quality and Global Climate Change Analyses*. This approach complies with CEQA case law culminating in *Neighbors for Smart Rail v. Exposition Metro Line Construction Authority* (2013, 57 Cal. 4th 439) by providing information on the baselines that are most relevant to the timing of impacts. Court decisions indicate that a projected future baseline is an appropriate means to analyze environmental effects of a long-term infrastructure project, when the reasons for using that future baseline are supported by substantial evidence.

The analysis of Cumulative Impacts will use the horizon year analysis that has been created for the air quality and greenhouse gas analysis. The cumulative impacts evaluation consists of a two part assessment, as described in further detail in Section 3.19. First, will the project in combination with the past, present and reasonably foreseeable future actions result in a significant cumulative impact? Second, if the cumulative impact is significant, will the project contribution to the significant cumulative impact be "considerable"?

3.3.4.4 Method for Determining Significance under NEPA

See Section 3.0.4.3 for a more detailed discussion of determining significance under NEPA.

NEPA does not provide a definitive threshold to determine significant or potentially significant impacts. For the purposes of the HSR project EIR/EIS document, the evaluation of NEPA impact significance does not use intensity gradations. As described in Section 1508.27 of the NEPA regulations, context and intensity are considered together when determining whether an impact is significant under NEPA. For air quality and global climate change, guidance from federal agencies specifies the following standards/thresholds for determining the significance of an impact:

- National Ambient Air Quality Standards
- General Conformity Thresholds

Project emissions of criteria pollutants are compared to the general conformity *de minimis* applicability thresholds (general conformity (GC) thresholds) on a calendar-year basis for both construction and operational emissions. If annual project-related emissions generated in a nonattainment or maintenance area exceed the GC thresholds, a GC determination is required. In addition, the project emissions may not cause new violations or exacerbate an existing violation of NAAQS. Table 3.3-4 presents an example of GC thresholds.

Table 3.3-4 General Conformity Thresholds (example only)

Pollutant	Federal Attainment Status	Threshold Values (tons/year)[1,2]
NO_2	Attainment	N/A
Ozone precursor (NO_x)[2]	Nonattainment: Extreme	10
Ozone precursor (VOC)[3]	Nonattainment: Extreme	10
CO	Maintenance	100
SO_x	Attainment	N/A
$PM_{2.5}$	Nonattainment	100
PM_{10}	Maintenance	100
$PM_{2.5}$ precursor (SO_2)[4]	Nonattainment	100
Lead	No Designation	N/A

[1] Thresholds from 40 C.F.R. Part 51 and 40 C.F.R. Part 93.
[2] Ozone reclassifications were made by USEPA on May 5, 2010.
[3] Only the urban portion of Fresno County is a maintenance area for CO.
[4] SO_2 has a GC threshold of 100 tons per year. Due to the stringent requirement of using ultra low sulfur content diesel in California, emissions of SO_2 anticipated from the project are expected to be negligible compared to the threshold. Therefore, no further analysis or evaluation is included for SO_2 in this report.

Acronyms:

GC	General Conformity
N/A	not applicable
NO_2	nitrogen dioxide
NO_x	nitrogen oxide
$PM_{2.5}$	particulate matter smaller than or equal to 2.5 microns in diameter
PM_{10}	particulate matter smaller than or equal to 10 microns in diameter
SO_2	sulfur dioxide
SO_x	sulfur oxide
VOC	volatile organic compound

Pursuant to NEPA, impacts on air quality would be considered to be significant if the project criteria pollutant emissions would exceed the general conformity *de minimis* thresholds (dependent on attainment status of each air basin) or whether the project would result in the creation or worsening of PM_{10}/$PM_{2.5}$ or CO hot spots. Currently, it is assumed that general conformity will apply only to construction of the HSR project, as the operations are expected to decrease regional emissions of criteria pollutants.

In cases where there are no defined thresholds, professional judgment is used when considering the resource context, the intensity and duration of the potential effect, and implementation of mitigation measures, to determine whether an impact is significant or less than significant.

3.3.4.5 Method for Determining Significance under CEQA

Based on the CEQA Guidelines, the project would have a significant impact if it would:

- Conflict with or obstruct implementation of the applicable air quality plan
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)
- Expose sensitive receptors to substantial pollutant concentrations
- Create objectionable odors affecting a substantial number of people
- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs

3.3.5 Affected Environment

Include in this section a concise summary description of existing air quality along the proposed HSR alignments and at proposed HSR facilities. In particular:

- Identify the air basins for your specific segment, including attainment status for each pollutant. A map may be created to illustrate the locations of the air basins, non-attainment areas, and project alternatives.
- Document established local policies concerning the context of air quality and global climate changes.
- Describe the status of applicable SIP and TIP.
- Describe pertinent stakeholder issues and concerns from public outreach efforts and personal contact with local agencies.
- Describe local meteorological conditions.
- Provide existing ambient air quality data at local air monitors for the past 3 years of available data (from CARB).
- Cross-reference all sections of the EIR/EIS that describe the resources or are related to the resources (e.g., for global climate change, refer to relevant content in Public Utilities from which energy information may have been obtained).

The following tables provide key information needed for complete description of the affected environment and typical sources for the information.

Table 3.3-5 Key Information and Sources for Affected Environment

Key Information	Sources of Information
▪ Air basins and attainment status ▪ Ambient air quality monitored data ▪ TIP and SIP status ▪ Local meteorological conditions	▪ CARB ▪ EPA ▪ Local MPOs ▪ NOAA ▪ Western Regional Climate Center

Table 3.3-6 Key Information and Sources for Local Meteorological Conditions

Key Information	Sources of Information
Brief description of the local meteorological conditions within the RSA	Western Regional Climate Center http://www.wrcc.dri.edu

Table 3.3-7 Key Information and Sources for Local Monitored Air Quality

Key Information	Sources of Information
▪ Short description of the local monitored data within each RSA (air basin) and summary of published monitoring data for the last 3 years from representative monitoring stations ▪ Two to three monitors used to represent each section ▪ Maps and sources	▪ CARB www.arb.ca.gov ▪ Air quality monitoring data

Table 3.3-8 Key Information and Sources for Sensitive Receptors

Key Information	Sources of Information
Description of sensitive receptors (population groups, such as children, the elderly, and acutely ill and chronically ill persons, especially those with cardio-respiratory diseases, who are considered more sensitive to air pollution than others (300 meters from stations and adjacent to intersections as identified above))	▪ Field review ▪ Aerial images ▪ Interviews with local planners

Table 3.3-9 Key Information and Sources for Ambient Air Quality Standards/ Attainment Status

Key Information	Sources of Information
▪ State and National Standards ▪ Summary of attainment status-related information for air basins ▪ Conformity documentation ▪ Comparison of local monitored data and state and national standards	▪ CARB standards, attainment status www.arb.ca.gov ▪ Emission sources: Project description of HSR system, traffic analysis report, energy analysis ▪ State Implementation Plan ▪ Regional transportation improvement plans ▪ Governor's Office Climate Change Portal ▪ Recent statewide strategic plans

Table 3.3-10 Key Information and Sources for Air Toxics

Key Information	Sources of Information
For (MSAT, FHWA Interim Guidance on Air Toxic Analysis	▪ Program EIS/EIR ▪ Conceptual engineering plans and profiles and project description ▪ FHWA Interim Guidance on Air Toxic Analysis (for analysis of mobile sources)

Table 3.3-11 Key Information and Sources for Relevant Pollutants

Key Information	Sources
Description of the pollutants of concern and related health effects: carbon monoxide, sulfur oxides, oxides of nitrogen, ozone, particulate matter (PM_{10} and $PM_{2.5}$), lead, and hydrocarbon levels (reactive organic gases and reactive organic compounds)	▪ CARB www.arb.ca.gov ▪ Program EIS/EIR

Table 3.3-12 Key Information and Sources for Greenhouse Gases/Global Climate Change

Key Information	Sources
▪ Composition of the state GHG emissions (transportation sources, stationary sources, natural occurring sources) ▪ Description of the welfare effect of climate change (such as, rising sea levels, snow pack in the Sierra Nevada's, low-lying areas, etc.)	▪ CARB climate page (www.arb.ca.gov) ▪ Governor's Office Climate Change Portal ▪ Recent statewide strategic plans ▪ Caltrans environmental document annotated outlines: www.dot.ca.gov/ser/forms.htm

3.3.6 Environmental Consequences

Give each impact a short description and number, that describes how the activity or physical change causes an impact upon the resource, e.g., *Impact AQ #1 The project's total GHG construction emissions for the BNSF alternative would be greater than the 25,000 metric tons of CO_2e threshold in the CEQ Guidance.* Simplify impact discussions whenever possible with references or citations to the more detailed information in the appendices. Tables should be used whenever possible to summarize the impacts and simplify the text.

The NEPA and CEQA assessments shall reach specific, separate conclusions about significance for each impact based on the significance criteria and identified methods for evaluating impacts. The explanation of impact significance must include the context, intensity, and duration of the impact and applicable threshold(s). For example:

> *Construction activities resulting in Greenhouse Gas Emissions*
>
> *The time that CO_2 remains in the atmosphere cannot be definitively quantified because of the wide range of the time scales in which carbon reservoirs exchange CO_2 with the atmosphere. Consequently, there is no single value for the half-life of CO_2 in the atmosphere (IPCC 1997). Therefore, the duration that CO_2 emissions from a short-term project (i.e., construction emissions) would remain in the atmosphere is unknown.*

As shown in Table X.X-N, GHG emissions from the construction phase were quantified according to the CEQ guidelines on considering GHG emissions in NEPA documents (CEQ 2010), because total emissions would be [greater than or less than] the 25,000 metric tons of CO_2e. The GHG construction emissions would be [approximately X.X%] of the total statewide GHG emissions. The half-life of CO_2 is not defined, and other GHG pollutants, such as N_2O, can remain in the atmosphere for 120 years (IPCC 1997). To conservatively estimate the amortized GHG emissions, the HSR project life is assumed to be only 25 years (although the actual project life will be much longer ((Barber 2010, personal communication)). The estimated amortized GHG construction emissions for each alternative would be [XXX metric tons CO_2e per year] as shown in Table X.X-N.

However, the increase in GHG emissions generated during construction would be offset by the net GHG reductions in operation (because car and plane trips are removed in the [project segment] in [XX months]. Operational GHG emissions are presented in Tables X.X-N and X.X-N.

Under NEPA, the project's total GHG constrution emissions would be [greater than or less than] 25,000 metric tons of CO_2e threshold suggested in the CEQ guidelines. However the construction emissions would be offset in less than [XX months] of the train operations. Therefore the construction GHG emissions would have impacts of [demonstrate impact intensity] under NEPA.

Under CEQA, the increase in the project's construction GHG emissions would be offset in [XX months] of the train operations. Therefore, the construction GHG emissions would be [demonstrate impact significance] under CEQA.

3.3.7 Mitigation Measures

General formatting and terminology for constructing the discussion of mitigation measures is provided in Section 3.0.7, Mitigation Measures. The following direction is specific for the evaluation of air quality and global climate change. Present the mitigation measures associated with the project alternatives within each geographic segment under the subheadings of Construction and Operations. The heading structure for the Air Quality and Global Climate Change EIR/EIS discussion is shown in Section 3.3.11 of these guidelines.

Develop project-level measures that are consistent with adopted program and project strategies that avoid or minimize impacts. Begin by considering programmatic mitigation strategies described in Section 3.0.7, as well as the following resource-specific guidance, as applicable to the HSR project section:

- The air quality and global climate change-related technical reports and environmental document sections in the most recent environmental documents produced by the Authority (e.g., *Fresno to Bakersfield Section Final EIR/EIS*, or more recent HSR project EIR/EIS)

Identify section-specific measures to mitigate any significant impacts, such as purchase of offsets for construction emissions.

Mitigation measures should have a brief descriptive title and a number, such as *AQ-MM#1*, that corresponds to the short description and number assigned to the primary resource impacts to assist tracking. Describe mitigation measures that are specific to the resource subsection and include code and title references to measures specific to other resources that provide mitigation benefits to the subsection resources. Draft the mitigation measures to facilitate transition into the Mitigation Monitoring and Enforcement Plan (MMEP) by identifying responsibility and timing for implementation, as appropriate. For example:

Prior to issuance of construction contracts, the Authority shall incorporate the following construction equipment exhaust emissions requirements into the

contract specifications. All heavy-duty off-road construction diesel equipment used during the construction phase will meet Tier 4 engine requirements. A copy of each unit's certified tier specification and any required CARB or Air Pollution Control District (APCD) operating permit will be made available to the Authority at the time of mobilization of each piece of equipment. The Contractor will keep a written record (supported by equipment-hour meters where available) of equipment usage during project construction for each piece of equipment. The Contractor shall provide the Authority with monthly reports of equipment operating hours (through Environmental Mitigation Management and Assessment system (EMMA)) and annual reports documenting compliance.

3.3.8 Impacts from Implementing Mitigation Measures

The overall content and approach to evaluating the impacts from implementing mitigation measures is presented in Section 3.0.8, Impacts from Implementing Mitigation Measures.

Consider and disclose both positive and negative impacts of mitigation measures as part of the environmental analysis. Evaluate all mitigation measures, including off-site measures, using the methods in Section 0. Determine probable impacts using actual, on-the-ground analysis and describe the substantial basis for analytical conclusions (including defined thresholds or other criteria). When the impacts of mitigation measures cannot be quantified (e.g., at a specific location, in a definite extent, at a particular time or duration, or measurable alteration of the affected resource), evaluate potential impacts using clearly described assumptions based upon reasonably foreseeable outcomes.

3.3.9 Impacts Summary

3.3.9.1 NEPA Impacts

The overall structure and content of this discussion is presented in Section 3.0.9.1, NEPA Impacts. The heading structure for this organizational scheme is shown in Section 3.3.11. Use maps, as appropriate, to show locations of significant impacts of alternatives by segment.

3.3.9.2 CEQA Significance Conclusions

The overall structure and content of this discussion is presented in Section 3.0.9.2, CEQA Significance Conclusions. The heading structure for this organizational scheme is shown in Section 3.3.11. Use maps, as appropriate, to show locations of significant unavoidable impacts of alternatives by segment.

3.3.10 Products

The RC is responsible for preparing the following products, under Authority and FRA direction, according to PMT guidance and subject to PMT quality control and assurance.

3.3.10.1 Technical Report or Appendix

In addition to the Volume 1 impacts analysis chapter, provide technical reports and Volume 2 appendices where full analysis applicable to the HSR project section requires details in excess of efficient inclusion in the EIR/EIS Volume 1 chapter. For example:

1. Volume 2, Appendix 2-E, Project Impact Avoidance and Minimization Features Analysis
2. Volume 2, Appendix 3.1-B, Regional and Local Policy Inventory
3. Volume 2, Appendix 3.3-A, Air Quality and Global Climate Change-related Appendices in recent EIR/EIS
4. Air Quality and Global Climate Change-related Technical Report

5. To be provided by PMT: Statewide emissions analysis; construction emissions analysis; HMF emissions analysis (if applicable); Federal General Conformity Determination

3.3.10.2 Project EIR/EIS Volume 1

1. Summary/Table for EIR/EIS Executive Summary
2. Project Description—Air Quality and Global Climate Change-related Components
   a. Impact Avoidance and Minimization Features
   b. Summary Table of Impact Avoidance and Minimization Features, and Project Impacts
3. Affected Environment, Environmental Consequences and Mitigation Measures Section: Air Quality and Global Climate Change
4. Affected Environment, Environmental Consequences and Mitigation Measures Section: Cumulative Impacts

3.3.11 Air Quality and Global Climate Change EIR/EIS Outline

The RC will use the following outline for organizing content related to Air Quality and Global Climate Change in Chapter 3 of the project EIR/EIS, using the heading hierarchy and format as indicated. The RC shall consider the impacts of implementing mitigation measures in Section 3.3.7.

3.3 Air Quality and Global Climate Change
- 3.3.1 Introduction
- 3.3.2 Laws, Regulations, and Orders
  - 3.3.2.1 Federal
  - 3.3.2.2 State
  - 3.3.2.3 Regional and Local
- 3.3.3 Regional and Local Policy Analysis
- 3.3.4 Methods for Evaluating Impacts
  - 3.3.4.1 Definition of Resource Study Area
  - 3.3.4.2 Pollutants for Analysis
  - 3.3.4.3 Method for Determining Significance under NEPA
  - 3.3.4.4 Method for Determining Significance under CEQA
- 3.3.5 Affected Environment
  - 3.3.5.1 Project Segment 1
    - Alternative 1
    - Alternative 2
    - Alternative 3
    - Alternative N
  - 3.3.5.2 Project Segment 2
    - Alternative 1
    - Alternative 2
    - Alternative 3
    - Alternative N
  - 3.3.5.3 Project Segment 3
    - Alternative 1
    - Alternative 2
    - Alternative 3
    - Alternative N
  - 3.3.5.4 Project Segment N
    - Alternative 1

Alternative 2
Alternative 3
Alternative N

3.3.6 Environmental Consequences

3.3.6.1 Overview

3.3.6.2 Project Segment 1

No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts

3.3.6.3 Project Segment 2

No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts

3.3.6.4 Project Segment 3

No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts

3.3.6.5 Project Segment N

No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2

Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts

3.3.7 Mitigation Measures
3.3.7.1 Project Segment 1
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.3.7.2 Project Segment 2
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.3.7.3 Project Segment 3
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.3.7.4 Project Segment N
Alternative 1
Construction Measures
Operations Measures
Alternative 2

Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures

3.3.8 NEPA Impact Summary

3.3.8.1 Alternative 1

Construction Impacts

Operations Impacts

3.3.8.2 Alternative 2

Construction Impacts

Operations Impacts

3.3.8.3 Alternative 3

Construction Impacts

Operations Impacts

3.3.8.4 Alternative N

Construction Impacts

Operations Impacts

3.3.9 CEQA Significance Conclusions

3.3.9.1 Alternative 1

Construction Impacts

Operations Impacts

3.3.9.2 Alternative 2

Construction Impacts

Operations Impacts

3.3.9.3 Alternative 3

Construction Impacts

Operations Impacts

3.3.9.4 Alternative N

Construction Impacts

Operations Impacts

3.4 Noise and Vibration

The methodology guidelines in this section are organized by a sequence of steps for preparing an environmental document. Section 3.4.11 provides an outline for this environmental impact report/environmental impact statement (EIR/EIS) section.

Section 3.0, General Methodology Guidance for Resource Sections, provides the methodological framework common to the evaluation of all resource areas. Section 3.19, Cumulative Impacts, provides the cumulative impact analysis methodology. Use Section 3.0 and Section 3.19 methods in combination with this Noise and Vibration guidance section when developing the EIR/EIS analyses.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the resource section. Example text that illustrates the concepts and methods is shown in *italics*. The methods are organized to mirror the organization of the EIR/EIS section or chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

If there is a discrepancy between the material in this guidance and any adopted federal and state agency guideline or manual applicable to noise and vibration, the agency guideline or manual controls. Identify and discuss any such discrepancy with the California High-Speed Rail Authority (Authority), Federal Railroad Administration (FRA), and the Program Management Team (PMT) before deviating from this guidance.

3.4.1 Introduction

The general method for preparing an introduction for this resource section is provided in Section 3.0.1, Introduction. The following discussion presents direction specific to Noise and Vibration.

Refer to related content in other sections of the EIR/EIS that influence or are influenced by the Noise and Vibration impact analysis (e.g., data and impact analyses from transportation, Section 4(f) and 6(f), biological resources and wetlands, station planning and land use, aesthetics and visual resources) and supportive/associated technical documents. References to other documents must include citation to specific sections (by lowest heading tier, e.g., 3.X.X), not just a general reference to a chapter in the EIR/EIS.

3.4.2 Laws, Regulations, and Orders

Federal, state, and local laws, regulations, and orders relevant to noise and vibration affected the geographic area that is affected by the project are presented below. General National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) requirements for assessment and disclosure of environmental impacts are described in Section 3.1, Introduction, and are therefore not restated in this resource section.

3.4.2.1 Federal

The Federal Railroad Administration's (FRA) *Railroad Noise Emission Compliance Regulation* (49 C.F.R. Part 210) prescribes minimum compliance regulations for enforcement of *Noise Emission Standards for Transportation Equipment; Interstate Rail Carriers* (40 C.F.R. Part 201) adopted by the U.S. Environmental Protection Agency (USEPA).

Procedures for Considering Environmental Impacts (64 Fed. Reg. 28545)

These FRA procedures state that an EIS should consider possible impacts on noise and vibration.

3.4.2.2 State

California Noise Control Act (Cal. Health and Safety Code, § 46010 et seq.)

At the state level, the California Noise Control Act of 1973 (Cal. Health and Safety Code, § 46010 et seq.) provides for the Office of Noise Control in the Department of Health Services to assist communities in developing local noise control programs and to work with the Office of Planning and Research to provide guidance for the preparation of the required noise elements in city and county general plans, pursuant to California Government Code, Section 65302(f). In preparing the noise element, a city or county must identify local noise sources and analyze and quantify, to the extent practicable, current and projected noise levels for various sources, including highways and freeways, passenger and freight railroad operations, ground rapid transit systems, commercial, general, and military aviation and airport operations, and other ground stationary noise sources (these would include HSR alignments). Noise-level contours must be mapped for these sources, using both community noise equivalent level and day-night average level, and are to be used as a guide in land use decisions to minimize the exposure of community residents to excessive noise.

3.4.2.3 Regional and Local

Compile a complete inventory of adopted local and regional plans, ordinances, or guidelines related to station planning, land use, and development. Use a tabular format similar to that used in the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014), or more recent HSR project EIR/EIS, to organize and concisely report this information.

Counties and cities in California prepare general plans with noise policies and ordinances (outlined above in the discussion of state regulations). These noise elements often incorporate specific allowable noise levels to achieve a quality environment. Where airports exist, the general plans often include a section on airport land use compatibility with respect to noise so that new, noise-sensitive uses are not located near or do not encroach on areas surrounding airports. General plans usually do not address ground-borne vibration. The HSR project is not subject to local general plan policies and ordinances related to noise limits on construction or to locally based criteria for determining the significance of a noise increase from a project.

This section of the methodology requires investigation of local noise policies and ordinances to determine the compatibility of the HSR project with local requirements. The method does not suggest that the project is subject to these local requirements.

This information will become part of Volume 2 Appendix 3.1-B Regional and Local Policy Inventory.

General Plan Policies

- Noise and land use elements
- Airport land use compatibility plans

Other Regional and Local Jurisdiction Policies

Jurisdictional noise ordinances and codes (and their requirements)

3.4.3 Regional and Local Policy Analysis

The overall structure of this discussion is presented in Section 3.0.3, Regional and Local Policy Analysis. As described in more detail in subsection 3.0.3.2, this analysis will describe any inconsistency or conflict with adopted regional or local policies and implementation of the HSR project.

3.4.4 Methods for Evaluating Impacts

Evaluation of impacts on noise and vibration is a requirement of the Noise Emission Compliance Regulation adopted by USEPA, the California Noise Control Act of 1973 (Cal. Health and Safety Code, § 46010 et seq.), CEQA, NEPA, and the following procedures.

- The methods and criteria for evaluating high-speed ground transportation noise and vibration impacts are found in FRA's *High-Speed Ground Transportation Noise and Vibration Impact Assessments* (FRA, September 2012) (FRA 2012 guidance manual).
- The methods and criteria for evaluating non-high speed transit noise and vibration impacts are found in the Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessments* (FTA 2006) (FTA 2006 guidance manual).
- The criteria for highway noise impacts (relevant to the extent HSR causes changes in traffic patterns) are included in the Federal Highway Administration's (FHWA) *Procedures for Abatement of Highway Traffic Noise and Construction Noise* (23 C.F.R. Part 772). The FHWA procedures are implemented as defined by Caltrans *Traffic Noise Analysis Protocol* (Caltrans 2011). FHWA requires each state to write its own noise policy, based upon FHWA's *Highway Traffic Noise: Analysis and Abatement Guidance* (FHWA 2011) (FHWA 2011 noise guidance). The state policy must address the issues of (1) required noise reduction needed for a wall to be reasonable, (2) cost of a reasonable wall, and (3) noise level reduction required for a receiver to be considered benefitted. The Caltrans *Traffic Noise Analysis Protocol* addresses these issues. Caltrans *Technical Noise Supplement* (Caltrans 1998) gives guidance on how Caltrans requires noise measurements, modeling, and barrier analyses to be done. Caltrans Standard Environmental Reference (SER) Volume 1 on Noise gives an outline for the noise report.

Each project EIR/EIS shall list all the modeling input and values as known based on the FRA 2012 guidance manual, the FTA 2006 guidance manual, and the FHWA and Caltrans noise analysis protocols if the project is changing the horizontal or vertical alignment of roadways.

The methods for evaluating impacts include defining the resource study area, considering impact avoidance and minimization features that are incorporated into the project in Section 2.5.2, Use of Progressive Baselines, applying NEPA and CEQA thresholds, and determining mitigation measures to reduce significant impacts.

3.4.4.1 Definition of Resource Study Area

The resource study area (RSA) is the area in which all environmental investigations specific to noise and vibration are conducted in order to determine the resource characteristics and potential impacts of the project segment. The factors making up the RSA and the description of the elements comprising the RSA (including an illustrative figure) are provided in Section 3.0.4.1, Definition of Resource Study Area, and Section 3.0.4.2, Methodology for Impact Analysis.

The boundaries of the RSA for noise and vibration extend beyond the project footprint. The noise and vibration impact analysis focuses on the effects of source noise on sensitive receivers, which is assessed at the receiver. Sensitive receivers include, but are not limited to, residential dwellings, schools, churches, hospitals, parks, amphitheaters, auditoriums, campground, cemeteries, day care centers, hospitals, libraries, parks, picnic areas, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio, television and recording studios, recreation areas and in some cases trails, and historic properties. For direct noise impacts on sensitive receivers, the study area is the project footprint, as described in Chapter 2, plus 2,500 feet from the proposed track centerline. This study area has been determined based on typical screening distances (Table 3.4-1) as defined by FRA and project-specific factors of the HSR project. Screening distances indicate whether any noise-sensitive receivers are near enough to the proposed alignment for a noise impact to be possible under typical conditions. If receivers are

located farther than these screening distances, FRA 2012 guidance manual has determined that impacts would be unlikely.

However, in some cases it might be necessary to expand the RSA to ensure the potential project impacts are fully analyzed. A primary reason for expanding the study area for direct noise impacts farther than the typical FRA screening distances is the potential for relatively low existing noise conditions at some locations within the study area. Another reason to extended the study area would be in locations were the project proposes roadway relocations. Consider the particular noise context, the characteristics of HSR-generated noise, amount of design information, and level of design detail to ensure that the RSA will be sufficient for each HSR project section.

Table 3.4-1, which groups screening distances by the type of corridor the project would occupy, takes into account whether the HSR alignment follows an existing rail line or highway or along a new transportation corridor. FRA has three speed ranges in its screening methodology; the highest speed range category (Regime III—170 mph or greater) was used to define the screening distance. These screening distances are based on general assumptions associated with typical projects, such as the number of train operations, train speeds, and existing noise conditions.

Table 3.4-1 Screening Distances for High-Speed Rail Speed Regime III[1]

Corridor Type	Existing Noise Environment	Screening Distance for Train Type and Speed Regime[2]
Railroad	Urban/noisy suburban—unobstructed	700 feet
	Urban/noisy suburban—intervening buildings[3]	300 feet
	Quiet suburban/rural	1,200 feet
Highway	Urban/noisy suburban—unobstructed	600 feet
	Urban/noisy suburban—intervening buildings[3]	350 feet
	Quiet suburban/rural	1,100 feet
New	Urban/noisy suburban—unobstructed	700 feet
	Urban/noisy suburban—intervening buildings[3]	350 feet
	Quiet suburban/rural	1,300 feet

[1] 170 mph or greater.
[2] Measured from centerline of alignment. Minimum distance is assumed to be 50 feet.
[3] Rows of buildings are assumed to be at 200, 400, 600, 800, and 1,000 feet away, parallel to the alignment.
Source: FRA 2012.

The vibration study area for the proposed project is as follows:

- HSR station study area—150 feet from the station boundary
- HSR alignment study areas, including existing railroads—up to 275 feet from the edge of the right-of-way
- Highway study areas—50 feet from the roadway centerline

The vibration impact assessment uses the FRA screening procedure. Screening distances indicate the potential for vibration impact on vibration-sensitive receivers. FRA 2012 guidance manual has determined that receivers located beyond the screening distances are not likely to be affected by the HSR. Table 3.4-2 presents the screening distances for vibration assessment.

The physical and operational elements of the RSA are listed in Table 3.4-3, which presents the required information sources and baseline metrics to help define the RSA.

Table 3.4-2 FRA Screening Distances for Vibration Assessment

Land Use	Train Frequency[1]	Screening Distance (feet)	
		Train Speed of 100 to 200 mph	Train Speed of 200 to 300 mph
Residential	Frequent	220	275
	Infrequent	100	140
Institutional	Frequent	160	220
	Infrequent	70	100

[1] Frequent = greater than 70 pass-bys per day; Infrequent = less than 70 pass-bys per day.
mph = mile(s) per hour
Source: FRA 2012.

Table 3.4-3 Resource Study Area Information

Required Information	Resource Study Area
▪ Aerial maps ▪ Geographic Information System base ▪ Project description—HSR system, linear and sited facilities, stations, operations, ancillary improvements ▪ Project plans and profiles, other design materials in sufficient detail to complete environmental impact assessment of all proposed improvements and operations within the affected geographic area ("project footprint") – Design elements include the HSR project and related facilities, temporary access and construction/staging areas, utility improvements and connections, etc. – Proposed relocated major roads and arterial roads ▪ Station locations and footprints in sufficient detail to complete environmental impact assessment of all construction and operations, regardless of implementation or operating entity ▪ Construction phases and interim build conditions/ transitions for all project and ancillary improvements, and stations ▪ Local and regional land use plans and other relevant land use documents	▪ Noise—Approximately 2,500 feet from the proposed track centerline (refer to screening distances for high-speed rail speed Regime III) ▪ Vibration—150 feet from station boundary, 275 feet from edge of right-of-way, 50 feet from roadway centerline (refer to FRA screening distances for vibration assessment) ▪ Other sections of the EIR/EIS (e.g., land use, biology, cultural resources, 4(f), and EJ) as appropriate for impacts related to or influencing noise and vibration ▪ Areas with proposed roadway realignments due to the project

The RSA for cumulative effects will be a broader area depending on the project section and will consider adjacent HSR project sections to ensure a broad consideration of impacts on a more regional and statewide basis. See Section 3.19, Methodology for Cumulative Impacts, for a more detailed discussion.

3.4.4.2 Methodology for Impact Analysis

Group and consolidate information and discussion in the EIR/EIS to effectively present information on noise and vibration impacts that would result from the proposed HSR alternatives to the lay audience (i.e., by distinct resource characteristic or component, such as construction noise and vibration, operational noise and vibration, station noise, and noise and vibration effects on animals). When detailed information on noise and vibration impacts is presented in the EIR/EIS Volume 2 Appendix associated with this resource, provide specific reference to the appendix in the Chapter 3 section on Noise and Vibration subsection to help the reader navigate between volumes.

Begin analysis of impacts with consideration of impact avoidance and minimization features that are incorporated into the project in Section 2.5.2, HSR Build Alternatives, and evaluated in Volume 2, Appendix 2-E. Account for implementation of design features or best management practices, such as compliance with FTA 2006 and FRA 2012 guidance manuals for minimizing construction noise and construction vibration impacts at sensitive receptors. Refer to the summary table of impact avoidance and minimization features and explain how particular features avoid impacts or ensure less-than-significant noise or vibration impacts.

Analyze direct and indirect impacts related to noise and vibration through quantitative and qualitative analysis. Analyze impacts that may occur during construction and operation of the HSR system (*Note*: the analytical results for construction impacts and operations impacts will be presented separately in the EIR/EIS). Apply the same impact thresholds in both project time-frames. Use professional judgment when considering the context and intensity of an effect to determine the significance of impacts. Consider all relevant aspects of context (e.g., existing noise levels, receptor sensitivity, presence of tunnel portals, proposed station, etc.) and appropriate factors of intensity (e.g., level of change, duration of change) for determining impact significance. Also consider project actions that improve or otherwise benefit resource values in the evaluation of impact significance.

Base the analysis on a review of available reports and data (including federal and state statutes, resource agency, local, and regional agency policies and ordinances), discussions with agency representatives in the region, field investigation, modeling (where applicable), and professional judgment. Develop geographic information system databases for each project segment. Develop all geographic information system data (1) as part of project design or (2) from available federal, state, and local sources. Provide sufficient detail to allow complete analysis of the anticipated design of the completed project or of reasonable assumptions for project implementation, including track layout and profiles, structures for grade-separated alignment crossings, maintenance and road access, maintenance and train storage facilities, etc. Focus analysis on the project's potential to alter existing conditions of the affected resources in the RSA(s).

Include a detailed map of sufficient scale to illustrate the geographic relationship of the alternatives to noise and vibration. The map boundary shall not exceed the extent of a project segment, and must clearly show the location and areal extent of project impacts and major landscape features (e.g., highways, major roads, local jurisdictions, perennial water bodies, or other geographical landmarks or features that convey relative location and size). Obtain Authority, FRA, and PMT concurrence on mapping scale before preparing an administrative draft EIR/EIS.

The methodology used to evaluate noise and vibration impacts is primarily based on the FRA 2012 guidance manual. It provides guidelines for establishing the extent of the study area to be used and for identifying noise-sensitive locations where increased annoyance (the startle effect) can occur from HSR pass-bys. It can be supplemented by the FTA 2006 guidance manual for non-HSR noise. The reason for using both documents is that the FRA 2012 guidance manual was developed for the measurement of noise and vibration impacts of HSR; however, it is not intended to supplant the FTA 2006 guidance manual for rail operations under 90 mph. For

construction impacts that do not differ by transportation type, use the FRA 2012 guidance manual. Table 3.4-4 identifies the key steps in the Noise and Vibration impacts analysis. The criteria for highway noise impacts (relevant to the extent HSR causes changes in traffic patterns) are from *Procedures for Abatement of Highway Traffic Noise and Construction Noise*. Professional judgment should be used for evaluation of noise impacts related to tunnel portals.

Table 3.4-4 Key Steps in Noise and Vibration Analysis

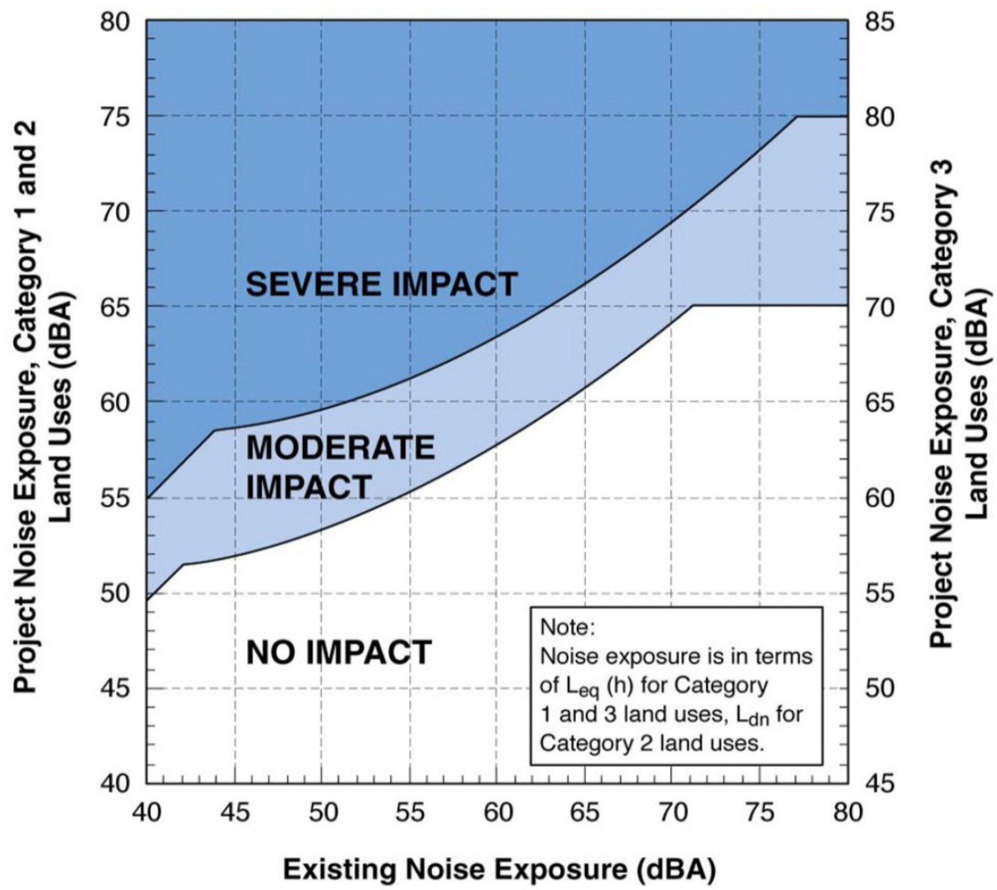
Key Steps	Sources
Train Operation Noise and Vibration	
Conduct HSR train operations noise and vibration impact analysis using the Detailed Noise Analysis (Chapter 5) and Detailed Vibration Assessment (Chapter 9) of the FRA Guidance Manual for Train Speeds over 126 mph. For Train Speeds under 126 mph, noise and vibration impacts should follow the Detailed Noise Analysis (Chapter 6) and the Detailed Vibration Analysis (Chapter 11) of the FTA Guidance Manual. *Note:* Overall, for impact analysis thresholds use the following: ▪ FRA Severe Noise Impact Criteria for HSR Operations ▪ FRA Moderate Noise Impact Criteria for HSR Operations ▪ FRA Increased Annoyance from Rapid Onset Rates of HSR Pass-bys ▪ FRA Interim Criteria for Noise Impacts on Animals ▪ FRA Vibration Impact Criteria for HSR Operations ▪ FTA Detailed Vibration Impact Criteria ▪ Caltrans Noise Abatement Criteria for Traffic ▪ FTA Noise Impact Criteria for Ancillary and Non-HSR Noise Sources	▪ FRA guidance manual (FRA 2012) ▪ FTA guidance manual (FTA 2006) ▪ Results of Model must be validated using *CAHSR Noise Benchmark-Test-Results*.
Station Noise	
Conduct station noise impact analysis using the FTA Manual as discussed in Section 6.7 (Noise Impact Assessment) for a detailed assessment. Impact assessment of other "fixed" noise/vibration-producing project components (e.g., ventilation fans, electrical generating, and substations) may be conducted using professionally accepted methods and practices.	FTA guidance manual (Section 6.7) (FTA 2006)
Traffic and Grade-Separation Noise	
▪ For any significant change in the horizontal or vertical alignment or location of an existing roadway or highway, conduct traffic and grade-separation noise modeling using the TNM® Version 2.5 as approved by Federal Highway Administration (FHWA) and the California Department of Transportation (Caltrans). The highway noise study methodology shall be suitable for preparing a Caltrans Noise Study Report and consistent with the Caltrans Traffic Noise Analysis Protocol and Technical Noise Supplement, August 2006. ▪ For traffic noise sources, follow the methods described in FHWA's *Highway Traffic Noise: Analysis and Abatement Guidance* (FHWA 2011) as defined by Caltrans *Traffic Noise Analysis Protocol* (Caltrans 2011).	▪ McTrans Center, PO Box 116585, Gainesville, FL 32611-6585 (352) 392-0378 http://mctrans.ce.ufl.edu ▪ Caltrans Standard Environmental Reference Volume 1 on Noise ▪ *Technical Noise Supplement* (Caltrans 1998) ▪ *Traffic Noise Analysis Protocol* (Caltrans 2011)

Table 3.4-4 Key Steps in Noise and Vibration Analysis (continued)

Key Steps	Sources
Non-HSR Sources	
▪ Conduct noise assessment for non-HSR sources (e.g., new or realigned, freight rail, light rail transit, or any changes to the existing rail or transit services) using the FTA Manual methods, and the Chicago Rail Efficiency and Transportation Efficiency noise model, or an equivalent model approved by the Program Manager may be used. ▪ For non-HSR noise sources, such as stations and maintenance facilities, follow the methods described in the FTA 2006 guidance manual. For construction noise, use the FRA 2012 guidance manual, Chapter 10—Noise and Vibration During Construction. ▪ For joint-use corridors with existing rail, use the FRA Horn Noise Model to assess benefits accrued by eliminating train horns at crossings. If it is considered a substantial noise source, the benefit of eliminating the highway-rail grade-crossing bell noise should also be evaluated. If it is considered a substantial noise source, the benefit of eliminating the highway-rail grade-crossing bell noise should also be evaluated.	▪ FRA guidance manual (FRA 2012) ▪ FTA guidance manual (FTA 2006) ▪ Chicago Rail Efficiency and Transportation Efficiency Freight Noise and Vibration Model www.fra.dot.gov/eLib/details/L03727 ▪ Horn Noise Assessment www.fra.dot.gov/Page/P0104
Construction Noise and Vibration	
Assess construction noise and impacts using the FRA 2012 guidance manual, FTA 2006 guidance manual, FHWA Roadway Construction Noise Model, U.S. Environmental Protection Agency construction noise data (updated), a combination of these methods, or an equivalent method approved by the Program Manager.	▪ FRA guidance manual (Chapter 10) (FRA 2012) ▪ Memorandum of the Release of FHWA Roadway Construction Noise Model (FHWA RCNM) Version 1.0 www.fhwa.dot.gov/environment/noise/construction_noise/rcnm/
Effects on Wildlife	
Assess construction and operation noise impacts on animals using the FRA 2012 guidance manual, Chapter 3, Interim Criteria for HSR Noise Effects on Animals.	▪ FRA guidance manual (Chapter 3) (FRA 2012) ▪ See HSR Program Bay Area EIR/EIS: note that the FRA criteria are for both wild animals and livestock

Train Operation Noise and Vibration Methodology

HSR operation noise and vibration levels are projected using current HSR System operation plans and the prediction models provided in the FRA 2012 guidance manual. Potential noise and vibration impacts are also evaluated in accordance with the FRA guidance manual. Tabulate projected noise and existing ambient noise exposures at the identified receivers or clusters of receivers. Compare the existing and project noise exposure based on the impact criteria shown in Figure 3.4-1 to determine the level of impact (no impact, moderate impact, or severe impact). Identify the level of impact by comparing existing noise levels (bottom of graph) with projected noise levels, left side of graph for land use Categories 1 or 2 and right side of chart for Category 3.



Source: FRA 2012

Figure 3.4-1 Noise Impact Criteria for High-Speed Rail Projects

Assumptions for train operation:

- Noise modeling projections assume atmospheric absorption of sound based on the International Standard ISO 9613-2.
- The noise analysis uses source reference levels for the very high speed Electric vehicle type listed in Table 5-2 of the FRA 2012 guidance manual. These adjustments assumed that trainsets would be distributed-power EMU vehicles with 8 cars and a maximum speed of 220 mph.
- The noise sources include the wheel/rail interface at 1 foot above top of rail, the propulsion noise at 2 feet above top of rail, and the aerodynamic noises from the train nose (at 10 feet above top of rail), the wheel region (at 5 feet above top of rail), and the pantograph (at 15 feet above top of rail).
- HSR track is assumed to be a combination of ballast and slab track with continuous welded rail, consistent with the assumptions in the FRA 2012 guidance manual. Slab construction will be used for elevated structures exceeding 1,000 feet in length, where operating speeds are planned for 220 mph. Slab track would be 3 decibel (dB) louder than ballast and tie track because of the decreased acoustic absorption compared to that provided by the ballast and changes to the track stiffness. The track form should be taken into account in consideration of ballast and slab track. There is a 2,500-foot boundary that includes the atmospheric absorption adjustment.

- Modeling uses the full system schedule of train operations as updated by the PMT and provided for inclusion in Chapter 2, Alternatives. Times of day of train runs will be specified in the operating schedule.
- Maximum speed is assumed to be 220 mph along the corridor depending upon speed profiles provided by Project Design files and interpreted by Parsons Brinckerhoff in July 2010.
- Top of rail elevations are based on preliminary design, as specified in California High-Speed Rail Authority (Authority) Technical Memorandum *15% Design Scope Guidelines TM 0.1*.
- The track is assumed to be on aerial structure wherever top-of-rail elevations are more than 20 feet above existing grade.
- All aerial structure sections of the corridor are assumed to be as described in the Technical Memorandum *TM 1.1.21 Typical Cross Section 15% R0 090404 TM Excerpt*.
- Buildings within the property acquisition footprint are not to be included in the impact assessment because they are assumed to be acquired and removed as part of the HSR footprint.
- FRA assessment of noise and vibration impacts is based upon existing noise levels. The HSR project will replace existing roadway/freight train/Amtrak at-grade crossings with grade-separations or roadway closures. Because this change will eliminate railroad horn warnings to oncoming vehicular and pedestrian traffic, the modeling for the HSR trains will not include the horn warnings. However, noise modeling in most cases was not done to analyze effects of the changes to the at-grade crossings on the existing noise levels from the existing freight and Amtrak trains. Therefore, there are no changes to the noise levels from the freight and Amtrak trains at locations where they presently blow their horns. But, if the at-grade crossing bells or freight and Amtrak train horns are one of the substantial noise sources in the area, the benefit of eliminating them should be studied.
- No adjustments are made to projected noise levels to account for increases in localized noise due to special trackwork, such as crossovers and turnouts, since the project will use special trackwork, which will not have gaps associated with crossovers.
- No noise exposure effects are assumed associated with changes in freight rail or Amtrak operations due to the implementation of the HSR project.
- Projections account for reduced noise emissions from the acoustic shielding provided where the HSR alignment would be in trenches.

Station Noise Methodology

Analyze HSR station noise at each noise-sensitive receiver using methodology in the FTA 2006 guidance manual (Section 6.7). Include a measurement program at representative clusters of receivers to determine existing ambient noise conditions and a noise prediction method to determine future noise conditions. Base the noise prediction on the following information:

- Type of train equipment to be used
- Train schedules (number of stopping trains and number of through trains during daytime and nighttime hours)
- Train consists (number of cars)
- Speed profiles of stopping trains and through trains
- Plans and profiles of elevated station structures

- Landform topography, such as buildings in the immediate vicinity of the station
- Noise level changes associated with changes to traffic volumes near the proposed HSR station

Tabulate the projected noise and existing ambient noise exposures at the identified receivers or clusters of receivers. Determine the level of impact (no impact, moderate impact, or severe impact) by comparing the existing and project noise exposure with the impact criteria shown in Figure 3.4-1.

Construction Noise and Vibration Methodology

Follow methodology described in the FTA 2006 guidance manual. For construction, the contractor and the Authority will make decisions regarding procedures and equipment. Estimated construction scenarios have been developed for typical railroad construction projects to use in predicting noise impacts and allowing for a quantitative vibration assessment.

Noise methodology should include:

- Noise emissions from equipment expected to be used by contractors
- Construction methods using the equipment identified above
- Usage scenarios for how the equipment will be operated
- Estimated site layouts of equipment along the right-of-way
- Relationship of the construction operations to nearby noise-sensitive receivers

Construction vibration is assessed quantitatively where a potential for blasting, pile-driving, vibratory compaction, demolition, or excavation close to vibration-sensitive structures exists. Criteria for annoyance and damage are applied to determine construction vibration impacts. The methodology includes:

- Vibration source levels from equipment expected to be used by contractors
- Estimated site layouts of equipment along the right-of-way
- Relationship of the construction operations to nearby vibration-sensitive receivers

Table 3.4-5 provides examples of construction and operation noise and vibration impacts. For all impacts, determine significance of impacts under NEPA and CEQA based on application of the methods listed in the following sections.

Table 3.4-5 Source and Description of Noise and Vibration Impacts

Source of Impacts	Description of Impacts
Construction activities with potential for impacts to noise and vibration	Pile driving, clearing, grubbing and grading project area, placement of ties and ballast
Operational impacts resulting from ongoing activities of the HSR system	▪ Traffic noise at stations, parking facilities, and grade-separations ▪ Changes in traffic volumes, primarily near the proposed HSR station sites ▪ Noise associated with increased traffic ▪ Stationary HSR-related noise sources ▪ Noise from heavy maintenance, maintenance-of-way, overnight servicing, and electrical power substations ▪ Noise from HSR traction power substations, maintenance facilities, and activities associated with maintenance, repair, and storage of HSRs ▪ Source noise, such as wheel squeal, shop activities, railcar washes, and warning horns ▪ Increase in ground-borne vibration inside buildings

Baselines

The substantial differences in timing and circumstances associated with HSR construction, initiation of HSR operations, interim and full HSR operations requires use of progressive baselines for thorough analysis of potential noise and vibration impacts. This approach will capture changes in noise and vibration conditions, and effects resulting from planned traffic improvement projects and the different stages of HSR operation. For example, RTPs include funded transportation projects that are programmed to be constructed by 2040, or subsequent horizon years in later RTPs. These projects are reasonably expected be in place before the HSR project reaches maturity (i.e., the point/year at which HSR-related transportation generation reaches its maximum). An accurate prediction of expected conditions for evaluation of the HSR project's noise and vibration impacts must consider these planned improvements in the underlying background conditions to which HSR project effects would be added.

Similar to, and in coordination with the baseline approach described in Section 3.2.4.2 for the transportation impact analysis, use four potential baselines for assessing project impacts:

1. Environmental Baseline #1: Existing + Construction—Impacts could include any road closures or lane reconfigurations that will be implemented during construction. These could be temporary impacts associated with construction, as well as permanent impacts affecting VMT through the altered roadway network.
2. Environmental Baseline #2: Date of Project Implementation—The analysis will consider estimated daily project ridership levels at the date of HSR segment implementation. These estimates will be consistent with information in the most recently adopted HSR Business Plan and will include the years of implementation for the following phases: Initial Operating Segment, Bay to Basin, and Phase 1. The methodology will use the year that trains will begin operation on that segment (according to latest adopted Business Plan; e.g. for the 2014 Business Plan: 2022 for Initial Operating Segment, 2027 for Bay to Basin, 2029 for Phase 1).
3. Environmental Baseline #3: Interim Terminus Stations—This will reflect maximum ridership at a timeframe between the date of implementation and horizon year. A separate analysis of impacts at interim terminus stations shall be included, if applicable, for Authority consideration in consultation with the FRA and station cities. The analysis shall determine the magnitude, severity, and duration of interim impacts, and potential mitigation options.
4. Environmental Baseline #4: Completion of Phase 1 (Horizon year) with full ridership—The timeframe for this baseline is indexed to the RTP(s) applicable to the HSR section (per NEPA practice) and the adopted HSR Business Plan. Current horizon year for HSR is 2040, but the horizon year will advance as RTPs and the HSR Business Plan are updated. The analysis may also consider completion of Phase 2 in future studies, as warranted by Authority business planning and as directed by the Authority.

Structure the impact analysis to allow incremental assessment of impacts related to road closures or lane reconfigurations implemented during construction, and HSR station traffic and circulation at initiation of rail service. Prepare a summary matrix that categorizes impacts from all four baseline analyses, primarily by construction impacts and operations impacts, and secondarily by interim impacts and permanent impacts.

Present details in *Appendix 3.4-A, Noise and Vibration Analyses*. This approach complies with CEQA case law culminating in *Neighbors for Smart Rail v. Exposition Metro Line Construction Authority* (2013, 57 Cal. 4th 439) by providing information on the baselines that are most relevant to the timing of impacts. The Court decision indicates that a projected future baseline is an appropriate means to analyze environmental effects of a long-term infrastructure project, when the reasons for using that future baseline are supported by substantial evidence.

The analysis of Cumulative Impacts will use the horizon year analysis that has been created for the noise and vibration analysis. The cumulative impacts evaluation consists of a two part assessment, as described in further detail in Section 3.19. First, will the project in combination with the past, present and reasonably foreseeable future actions result in a significant cumulative impact? Second, if the cumulative impact is significant, will the project contribution to the significant cumulative impact be "considerable"?

3.4.4.3 Method for Determining Significance under NEPA

For noise and vibration, FRA's impact assessment method provides guidance on determining the significance of impacts. FRA guidance is based upon the Council on Environmental Quality NEPA regulations (40 C.F.R. Part 1500–1508). For assessing the noise impacts from relocation of major roadways, use FHWA 2011 noise guidance, which for projects in California can be found in Caltrans *Traffic Noise Analysis Protocol* and *Technical Noise Supplement*.

Depending on the magnitude of the cumulative noise increases, FTA and FRA categorize impacts as (1) no impact, (2) moderate impact, or (3) severe impact. Severe impact is where a significant percentage of people would be highly annoyed by the project's noise. Moderate impact is where the change in the cumulative noise level would be noticeable to most people, but may not be sufficient to generate strong, adverse reactions. See Section 3.0 for discussion of NEPA thresholds.

Construction Thresholds

The construction noise and vibration threshold is the exposure of noise- and vibration-sensitive receivers to construction noise or vibration at levels exceeding standards established by FTA and established thresholds for architectural and structural building damage (FTA 2006).

Construction noise assessment is based on guidelines included in the FTA 2006 guidance manual, as well as consideration of local noise ordinances. The Authority applies uniform noise and vibration criteria for construction based on FTA and FRA guidance. Table 3.4-6 shows FTA assessment criteria for construction noise. An 8-hour equivalent sound level (L_{eq}) and a 30-day average noise exposure are used to assess impacts. The last column applies to construction activities that extend over 30 days near any given receiver. An 8-hour L_{eq} and a 30-day average noise exposure are used to assess impacts. A 30-day average day-night sound level (L_{dn}) is used to assess impacts in residential areas, and a 30-day average 24-hour L_{eq} is used to assess impacts in commercial and industrial areas. The 8-hr L_{eq} and the 30-day average L_{dn} noise exposure from construction noise calculations use the noise emission levels of the construction equipment, their location, and operating hours. The construction noise limits are normally assessed at the noise-sensitive receiver property line edge.

Table 3.4-6 FTA Construction Noise Assessment Criteria

Land Use	8-hour L_{eq}, dBA		Noise Exposure, L_{dn}, dBA
	Day	Night	30-day Average
Residential	80	70	75[1]
Commercial	85	85	80[2]
Industrial	90	90	85[2]

[1] In urban areas with very high ambient noise levels (L_{dn} greater than 65 dB), L_{dn} from construction operations should not exceed existing ambient + 10 dB.
[2] 24-hour L_{eq}, not L_{dn}
dBA = A-weighted decibel(s)
L_{dn} = day-night sound level
L_{eq} = equivalent sound level
Source: FTA 2006.

The FTA guidance manual provides the basis for the construction vibration assessment. The FTA criteria include two ways to express vibration levels: (1) root-mean-square vibration velocity level (VdB) for annoyance and activity interference, and (2) peak particle velocity, which is the maximum instantaneous peak of a vibration signal used for assessment of damage potential.

To avoid temporary annoyance to building occupants during construction or construction interference with vibration-sensitive equipment inside special-use buildings, such as a magnetic resonance imaging machine, FTA recommends using the same level as the long-term operational vibration criteria provided later in this methodology guidelines under the Vibration Criteria—HSR Operations discussion. However the primary concern with construction vibration is the potential for damage to buildings. Table 3.4-7 lists the velocity limits for four building categories, which should be used as the criteria to identify problem locations that must be addressed during final design.

Table 3.4-7 Construction Vibration Damage Criteria

Building Category	PPV (inch/sec)	Approximate Lv[1]
I. Reinforced concrete, steel, or timber (no plaster)	0.5	102
II. Engineered concrete and masonry (no plaster)	0.3	98
III. Non-engineered timber and masonry buildings	0.2	94
IV. Buildings extremely susceptible to vibration damage	0.12	90

[1] RMS vibration velocity level in VdB relative to 1 micro-inch/second.
PPV = peak particle velocity
Source: FTA 2006.

Operations Thresholds

Noise Criteria—HSR Operations

The descriptors and criteria for assessing noise impacts vary according to land use categories adjacent to the track. For land uses where people live and sleep (e.g., residential neighborhoods, hospitals, and hotels), the L_{dn} is the assessment parameter. For other land-use types where there are noise-sensitive uses (e.g., outdoor concert areas, schools, and libraries), the L_{eq} (h) for an hour of noise sensitivity that coincides with train activity is the assessment parameter. Table 3.4-8 summarizes the three land use categories.

Specific types of impacts use other noise descriptors as appropriate for specific types of impacts. Determine the noise exposure from an individual train passage, called the SEL, for disturbance of wildlife and domestic animals. Evaluate the potential for startle effects for people near the HSR in terms of a combination of train speed and distance from the track.

The noise impact criteria used by the FRA and FTA are ambient-based; the increase in future noise (future noise levels with the project compared to existing noise levels) is assessed rather than the noise caused by each passing train. The criteria specify a comparison of future project noise with existing levels because comparison with an existing condition is more accurate (FRA 2012). Figure 3.4-1 shows the FRA noise impact criteria for human annoyance. Depending on the magnitude of the cumulative noise increases, FTA and FRA categorize impacts as (1) no impact, (2) moderate impact, or (3) severe impact. Severe impact is where a significant percentage of people would be highly annoyed by the project's noise. Moderate impact is where the change in cumulative noise level would be noticeable to most people, but may not be sufficient to generate strong, adverse reactions.

Table 3.4-8 FRA Noise-Sensitive Land Uses

Land Use Category	Noise Metric dBA[1]	Land Use Category
1	Outdoor L_{eq}(h)b	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, such as outdoor amphitheaters, concert pavilions, and National Historic Landmarks with significant outdoor use.
2	Outdoor L_{dn}	Residences and buildings where people normally sleep. This category includes homes and hospitals, where nighttime sensitivity to noise is of utmost importance.
3	Outdoor L_{eq}(h)[2]	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration. Buildings with interior spaces where quiet is important, such as medical offices, conference rooms, recording studios, concert halls, fall into this category, as well as places for meditation or study associated with cemeteries, monuments, and museums. Certain historical sites, parks, and recreational facilities are also included.

[1] Onset-rate adjusted sound levels (L_{eq} and L_{dn}) are to be used where applicable.
[2] L_{eq} for the noisiest hour of transit-related activity during hours of noise sensitivity.
dBA = A-weighted decibel(s)
L_{eq} = equivalent sound level, dBA
Source: FRA 2012.

Noise Criteria—Traffic

The criteria for highway noise impacts (relevant to the extent HSR causes changes in traffic patterns) are from 23 C.F.R. Part 772. Table 3.4-9 summarizes the traffic noise abatement criteria. A noise impact occurs if projected noise levels approach the levels for specific land use categories listed in Table 3.4-9, or substantially exceed existing noise levels, as defined by Caltrans. In accordance with the regulations, a traffic noise analysis is required only for projects that include: (1) construction of a new highway or (2) reconstruction of an existing highway with a substantial change in the horizontal alignment or vertical profile or an increase in the number of through traffic lanes. If impacts are identified, consider noise abatement. In addition, FHWA guidance regarding the physical alteration of an existing highway states *changes in the horizontal alignment that reduce the distance between the source and the receiver by half or more result in a Type 1 project* (FHWA 2010). A Type 1 project is defined in 23 C.F.R. Part 772 as a proposed federal or federal-aid highway project for the construction of a highway at new location or the physical alteration of an existing highway that significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes. FHWA requires identifying highway traffic noise impacts and examining potential abatement measures for all Type 1 projects receiving federal funds.

Caltrans is responsible for implementing the FHWA regulations in California. Under Caltrans policy, a traffic-noise impact occurs if projected noise levels are within 1 dB of the FHWA criteria shown in Table 3.4-9; therefore, a residential impact occurs at 66 dBA L_{eq}, and a commercial impact occurs at 71 dBA L_{eq}.

Table 3.4-9 FHWA Traffic Noise Abatement Criteria

Land Use Category		Hourly L_{eq}
Type A	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.	57 dBA (exterior)
Type B[1]	Residential	67 dBA (exterior) 52 dBA (interior)
Type C[1]	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings	67 dBA (exterior)
Type D	Auditoriums, daycare centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios	52 dBA (interior)
Type E[1]	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A through D or F.	72 dBA (exterior)
Type F	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing	NA
Type G	Undeveloped lands that are not permitted.	72 dBA (exterior)

[1] Includes undeveloped lands permitted for this activity category.
dBA = A-weighted decibel(s)
FHWA = Federal Highway Administration
L_{eq} = Equivalent sound level
NA = Not Available
Source: 23 C.F.R. Part 772

Noise Criteria—Wildlife and Domestic Animals

FRA noise exposure limits for wildlife (mammals and birds) and domestic animals (livestock and poultry) are an SEL of 100 dBA from passing trains as shown in Table 3.4-10.

Table 3.4-10 Interim Criteria for High-Speed Train Noise Effects on Animals

Animal Category	Class	Noise Metric	Noise Level (dBA)
Domestic	Mammals (Livestock)	SEL	100
	Birds (Poultry)	SEL	100
Wild	Mammals	SEL	100
	Birds	SEL	100

dBA = A-weighted decibel(s)
Source: FRA 2012.

Vibration Criteria—HSR Operations

Ground-borne vibration impacts from HSR operations inside vibration-sensitive buildings are defined by the vibration velocity level, expressed in terms of VdB, and the number of vibration events per day of the same kind of source. Table 3.4-11 summarizes vibration sensitivity in terms of the three land use categories and the criteria for acceptable ground-borne vibrations and acceptable ground-borne noise. Ground-borne noise is generally not a problem for buildings near railroad tracks at- or above-grade, because the airborne noise from trains typically overshadows effects of ground-borne noise. Ground-borne noise becomes an issue in cases where airborne noise cannot be heard, such as for buildings near tunnels.

The FRA provides guidelines to assess the human response to different levels of ground-borne noise and vibration, as shown in Table 3.4-11. These levels represent the maximum vibration level of an individual train pass-by. A vibration event occurs each time a train passes the building or property and causes discernible vibration. "Frequent Events" are more than 70 vibration events per day, and "Infrequent Events" are fewer than 70 vibration events per day. The guidelines also provide criteria for special buildings very sensitive to ground-borne noise and vibration, such as concert halls, recording studios, and theatres. Table 3.4-12 shows the impact criteria for special buildings.

Table 3.4-11 and Table 3.4-12 include separate FRA criteria for ground-borne noise (the "rumble" that radiates from the motion of room surfaces in buildings from ground-borne vibration). Although the criteria are expressed in dBA, which emphasizes the more audible middle and high frequencies, the criteria are significantly lower than airborne noise criteria to account for the annoying low-frequency character of ground-borne noise. Because airborne noise often masks ground-borne noise for aboveground (i.e., at-grade or elevated) high-speed trains, ground-borne noise criteria apply primarily to operations in a tunnel, where airborne noise is not a factor.

Table 3.4-11 FRA Ground-Borne Vibration and Ground-Borne Noise Impact Criteria

	Ground-Borne Vibration Impact Criteria (VdB relative to 1 micro inch/second)		Ground-Borne Noise Impact Criteria (dB re 20 microPascals)	
Land Use Category	Frequent Events[1]	Infrequent Events[2]	Frequent Events[1]	Infrequent Events[2]
Category 1: Buildings where vibration would interfere with interior operations	65 VdB[3]	65 VdB[3]	NA[4]	NA[4]
Category 2: Residences and buildings where people normally sleep	72 VdB	80 VdB	35 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use	75 VdB	83 VdB	40 dBA	48 dBA

[1] Frequent Events is defined as more than 70 vibration events per day.
[2] Infrequent Events is defined as fewer than 70 vibration events per day.
[3] This criterion limit is based on levels that are acceptable for most moderately sensitive equipment, such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the heating, ventilating and air conditioning systems, and stiffened floors.
[4] Vibration-sensitive equipment is not sensitive to ground-borne noise.
dB = decibel(s)
FRA = Federal Railroad Administration
VdB = vibration velocity level
Source: FRA 2012.

Table 3.4-12 FRA Ground-Borne Vibration and Ground-Borne Noise Impact Criteria for Special Buildings

Type of Building or Room	Ground-Borne Vibration Impact Criteria (VdB relative to 1 micro-inch/second) Frequent Events[1]	Ground-Borne Vibration Impact Criteria (VdB relative to 1 micro-inch/second) Infrequent Events[2]	Ground-Borne Noise Impact Criteria (dB relative to 20 microPascals) Frequent Events	Ground-Borne Noise Impact Criteria (dB relative to 20 microPascals) Infrequent Events[2]
Concert Hall	65 VdB	65 VdB	25 dBA	25 dBA
TV Studio	65 VdB	65 VdB	25 dBA	25 dBA
Recording Studio	65 VdB	65 VdB	25 dBA	25 dBA
Auditorium	72 VdB	80 VdB	30 dBA	38 dBA
Theater	72 VdB	80 VdB	35 dBA	43 dBA

[1] *Frequent Events* is defined as more than 70 vibration events per day.
[2] *Infrequent Events* is defined as fewer than 70 vibration events per day.
dB = decibel(s)
dBA = A-weighted decibel(s)
VdB = vibration velocity level
Source: FRA 2012.

In order to determine the actual transmission characteristics of vibration through the soils along the project right-of-way, conduct transfer mobility testing. Transfer mobility is a measure of the relationship between the exciting force and the response at each accelerometer position. This testing shows that all residential structures within a distance of 86 feet and all 4(f) site structures within a distance of 190 feet from the centerline of any proposed at-grade alignment have the potential to be impacted by vibration levels from the HSR project.

3.4.4.4 Method for Determining Significance under CEQA

Based on CEQA Guidelines, the project would have a significant impact if it would:

- Expose persons to or generate noise levels in excess of severe impact standards for a severe impact established by the FRA for high-speed ground transportation and by the FTA for transit projects. These standards cover both permanent and temporary/periodic increases in ambient noise levels in the project vicinity above levels existing without the project
- Expose persons to or generate excessive ground-borne vibration or ground-borne noise levels
- Permanently substantially increase ambient noise levels in the project vicinity above levels existing without the project
- Temporarily or periodically substantially increase ambient noise levels in the project vicinity above levels existing without the project

3.4.5 Affected Environment

Include a concise summary description of ambient noise conditions and existing noise sensitive receptors along the proposed HSR alignments and at proposed HSR facilities. In particular:

- Identify all relevant sensitive noise and vibration receptors. A map should be created to illustrate the locations of noise sensitive receptors, alternatives, and proposed mitigation measures.
- Describe ambient noise conditions in the project area and in the vicinity of potentially affected noise receivers.
- Document established local policies concerning the context of noise- and vibration-related impacts.

- Describe pertinent stakeholder issues and concerns from public outreach efforts and personal contact with local agencies.
- Cross-reference all sections of the EIR/EIS (by lowest heading tier, e.g., 3.X.X) that describe the resources or are related to the resources (e.g., Transportation, Section 4(f) and 6(f), Biological Resources and Wetlands, Station Planning and Land Use, Aesthetics and Visual Resources, Cumulative).

Table 3.4-13 lists key information needed for a complete description of the Affected Environment and typical sources for the information.

Table 3.4-13 Key Information and Sources for Affected Environment

Key Information	Sources for Information
▪ Identification of noise and vibration sensitive land uses, activities, and receivers ▪ Measurement of existing noise levels at representative land uses and noise-sensitive receivers within close proximity to the HSR alignment at a distance and frequency that is consistent with the FRA guidance manual ▪ Existing noise contours provided in airport master plans or issued by the airport authority where airport noise may be a substantial contributor to the ambient level of environmental noise or was identified as such in the Program EIR/EIS ▪ Existing vibration during pass-by events of existing rail operations at receivers closest to HSR alignment at a location and frequency that is consistent with the FRA Manual where the HSR alignment is either within close proximity to or part of an existing rail corridor ▪ Coordination with land use, biology, and cultural resources to identify sensitive receivers ▪ Existing ambient vibration levels where the HSR alignment is in close proximity to Section 106 Historic Properties	▪ Local/regional study reports (i.e., Southern California Association of Governments, San Diego Association of Governments studies) ▪ Local noise elements/background reports ▪ Local land use elements/maps ▪ FTA guidance manual (FTA 2006) ▪ FRA guidance manual (Chapter 8, General Vibration Assessment) (FRA 2012) ▪ FRA guidance manual (Chapter 9, Detailed Vibration Assessment) (FRA 2012) ▪ FHWA 2011 noise guidance, Caltrans guidelines

3.4.6 Environmental Consequences

General formatting and terminology for constructing the discussion of environmental consequences is provided in Section 3.0.6, Environmental Consequences. The following direction is specific for the evaluation of Noise and Vibration. The heading structure for the Noise and Vibration EIR/EIS discussion is shown in Section 3.4.11.

Give each impact a short descriptive title, e.g., *N&V Impact #1 Construction pile driving would expose persons to excessive ground-borne noise levels*. Explain the results of the analysis prescribed in the Methods for Evaluating Impacts subsection. In particular, describe how the activity or physical change causes an impact on sensitive receptors. For example: *Operation of the HSR system would increase noise levels by as much as 5 dBA L_{dn} at the noise measurement sites and 19 dBA L_{dn} at a modeled historical structure site. The increase in noise has a potential to cause moderate to severe noise impacts for some of the receivers along the project alignment according to the FRA impact criteria.* Simplify impact discussions whenever possible with references or citations to the more detailed information in the appendices.

The NEPA and CEQA assessments shall reach specific separate conclusions about significance for each impact based on the significance criteria and methods defined in the NEPA and CEQA subsections of the Methods for Evaluating Impacts sections. For example: *The permanent construction of a noise barrier on one side of the HSR tracks may cause reflective noise on the opposing side of the tracks. This reflective noise may cause an increase in the noise levels, which may result in a noise impact.* If the levels are above the severe noise levels for the area this would be considered a significant impact under CEQA. Under NEPA and the HSR guidelines raising the levels to severe would require that mitigation options be evaluated.

3.4.7 Mitigation Measures

General formatting and terminology for constructing the discussion of mitigation measures is provided in Section 3.0.7, Mitigation Measures. The following direction is specific for the evaluation of Noise and Vibration. Present the mitigation measures associated with the project alternatives within each geographic segment under the subheadings of Construction Measures and Operations Measures. The heading structure for the Noise and Vibration EIR/EIS discussion is shown in Section 3.4.11. Give each mitigation measure a short descriptive title and a number, such as *N&V-MM#1*, that corresponds to the primary significant impact for which the measure is proposed (if practical).

Develop project-level measures that are consistent with adopted program and project strategies that avoid or minimize impacts. Begin by considering programmatic mitigation strategies identified in Section 3.0.7, as well as the following resource-specific guidance, as applicable to the HSR project section:

- Authority Technical Memorandum—*Noise and Vibration Mitigation Guidelines* (Adopted May 3, 2012)
- The noise- and vibration-related technical reports and environmental document sections in the most recent environmental documents produced by the Authority (e.g., *Fresno to Bakersfield Section Final EIR/EIS*)
- FHWA procedures for abatement of highway traffic noise and construction noise (23 C.F.R. Part 772)

Refine the general minimization and abatement strategies into project-level, project-specific minimization and abatement measures that are coupled to project-level and specific impacts. For example:

- Identify section-specific measures to mitigate any significant impacts, such as construction of a sound wall
- Describe and analyze effectiveness of noise and vibration mitigation measures addressing sources, path, and receivers as appropriate using FRA, FTA, Caltrans, and Authority guidance as appropriate
- Describe the cost and reasonableness of noise and vibration mitigation and how it compares to the Authority Technical Memorandum—*Noise and Vibration Mitigation Guidelines*
- Identify and analyze adverse environmental impacts that may result from implementing the mitigation measures described for specific portions of the HSR section (e.g., noise barriers—design, dimensions, impacts (including aesthetic, visual, and community impacts))

Draft mitigation measures to facilitate transition into the Mitigation Monitoring and Enforcement Plan (MMEP) by clearly identifying responsibility and timing for implementation, as appropriate.

3.4.8 Impacts from Implementing Mitigation Measures

General guidance for constructing the discussion of impacts from implementing mitigation measures is provided in Section 3.0.8, Impacts from Implementing Mitigation Measures.

Mitigation measures can cause both positive and negative impacts that must be disclosed and considered as part of the environmental analysis. For example, placing a noise barrier along one side of the HSR alignment to reduce noise impacts to sensitive receptors (beneficial effect), may lead to reflective noise on the other side of the tracks (adverse effect). In this case, make reasonable assumptions about the potential for reflective noise, and note the impacts caused by the noise reflection, such as effects on other sensitive receptors, increase in ambient noise levels, or indirect changes in noise frequency (may be positive or negative).

Evaluate all mitigation measures, including off-site measures, using the methods in Section 0. Determine probable impacts using actual, on-the-ground analysis and describe the substantial basis for analytical conclusions (including defined thresholds or other criteria). When the impacts of mitigation measures cannot be quantified (e.g., at a specific location, in a definite extent, at a particular time or duration, or measurable alteration of the affected resource), evaluate potential impacts using clearly described assumptions based upon reasonably foreseeable outcomes.

3.4.9 Impacts Summary

3.4.9.1 NEPA Impacts

The overall structure and content of this discussion is presented in Section 3.0.9.1, NEPA Impacts. The heading structure for this organizational scheme is shown in Section 3.4.11. Use maps, as appropriate, to show locations of significant impacts of alternatives by segment.

3.4.9.2 CEQA Significance Conclusions

The overall structure and content of this discussion is presented in Section 3.0.9.2, CEQA Significance Conclusions. The heading structure for this organizational scheme is shown in Section 3.4.11. Use maps, as appropriate, to show locations of significant unavoidable impacts of alternatives by segment. Explain the reason why any mitigation measure will reduce the impacts of specific impacts, and conclude what the level of significance is after mitigation. The reason for the reduction or avoidance of an impact should be directly related to the thresholds of significance.

3.4.10 Products

The RC is responsible for preparing the following products, under Authority and FRA direction, according to Project Management Team (PMT) guidance and subject to PMT quality control and assurance.

3.4.10.1 Technical Report or Appendix

In addition to the Volume 1 impacts analysis chapter, provide technical reports or Volume 2 appendices where full analysis applicable to the HSR project section requires details in excess of efficient inclusion in the EIR/EIS Volume 1. For example:

1. Volume 2, Appendix 2-E, Project Impact Avoidance and Minimization Features Analysis
2. Volume 2, Appendix 3.1-B, Regional and Local Policy Inventory
3. Volume 2, Appendix 3.4-A, Noise and Vibration-related Appendices in recent EIR/EIS
4. Noise and Vibration Technical Report

(The report shall conform to the requirements and topics set forth in Section 11.1 (The Technical Report on Noise and Vibration) and Section 11.1.1 (Organization of Technical Report) of the FRA 2012 guidance manual.)

3.4.10.2 Project EIR/EIS Volume 1

1. Summary/Table for EIR/EIS Executive Summary
2. Project Description—Noise and Vibration-related Components
   a. Impact Avoidance and Minimization Features
   b. Summary Table of Impact Avoidance and Minimization Features, and Project Impacts
3. Affected Environment, Environmental Consequences and Mitigation Measures Section: Noise and Vibration
4. Affected Environment, Environmental Consequences and Mitigation Measures Section: Cumulative Impacts

3.4.11 Noise and Vibration EIR/EIS Outline

The RC shall use the following outline for organizing content related to the Noise and Vibration in Chapter 3 of the project EIR/EIS, using the heading hierarchy and format as indicated. The RC shall consider the impacts of implementing mitigation measures in Section 3.4.7.

3.4 Noise and Vibration
- 3.4.1 Introduction
- 3.4.2 Laws, Regulations and Orders
  - 3.4.2.1 Federal
  - 3.4.2.2 State
  - 3.4.2.3 Regional and Local
- 3.4.3 Regional and Local Policy Analysis
- 3.4.4 Methods for Evaluating Impacts
  - 3.4.4.1 Definition of Resource Study Area
  - 3.4.4.2 Method for Determining Significance under NEPA
  - 3.4.4.3 Method for Determining Significance under CEQA
- 3.4.5 Affected Environment
  - 3.4.5.1 Project Segment 1
    - Alternative 1
    - Alternative 2
    - Alternative 3
    - Alternative N
  - 3.4.5.2 Project Segment 2
    - Alternative 1
    - Alternative 2
    - Alternative 3
    - Alternative N
  - 3.4.5.3 Project Segment 3
    - Alternative 1
    - Alternative 2
    - Alternative 3
    - Alternative N
  - 3.4.5.4 Project Segment N
    - Alternative 1
    - Alternative 2
    - Alternative 3
    - Alternative N

3.4.6 Environmental Consequences
3.4.6.1 Overview
3.4.6.2 Project Segment 1
No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.4.6.3 Project Segment 2
No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.4.6.4 Project Segment 3
No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.4.6.5 Project Segment N
No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts

Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.4.7 Mitigation Measures
3.4.7.1 Project Segment 1
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.4.7.2 Project Segment 2
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.4.7.3 Project Segment 3
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.4.7.4 Project Segment N
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures

3.5 Electromagnetic Fields and Electromagnetic Interference

The methodology guidelines in this section are organized by a sequence of steps for preparing an environmental document. Section 3.5.11 provides an outline for the environmental impact report/environmental impact statement (EIR/EIS) section.

Section 3.0, General Methodology Guidance for Resource Sections, provides the methodological framework common to the evaluation of all resource areas. Section 3.19, Cumulative Impacts, provides the cumulative impact analysis methodology. Use the data and impact analyses in Section 3.0 and Section 3.19 in combination with this Electromagnetic Fields and Electromagnetic Interference (EMF/EMI) guidance section when developing the EIR/EIS analyses.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the resource section. Example text that illustrates the concepts and methods is shown in *italics*. The methods are organized to mirror the organization of the EIR/EIS section or chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

If there is a discrepancy between the material in this guidance and any adopted federal and state agency guideline or manual applicable to EMF/EMI, the agency guideline or manual controls. Identify and discuss any such discrepancy with the California High-Speed Rail Authority (Authority), Federal Railroad Administration (FRA), and the Program Management Team (PMT) before deviating from this guidance.

3.5.1 Introduction

The general method for preparing an introduction for this resource section is provided in Section 3.0.1, Introduction. The following discussion presents direction specific to Electromagnetic Fields and Electromagnetic Interference.

Refer specifically to related content in other sections of the EIR/EIS that influence or are influenced by the EMF/EMI impact analysis (e.g., data and impact analysis in public utilities, safety and security, station planning and land use, agricultural lands, and regional growth) and supportive/associated technical documents. References to other documents must include citation to specific sections (by lowest heading tier, e.g., 3.X.X), not just a general reference to a chapter in the EIR/EIS.

EMFs are electric and magnetic fields. Electric fields describe forces that electric charges exert on other electric charges. Magnetic fields describe forces that a magnetic object or moving electric charge exerts on other magnetic materials and electric charges. EMFs occur throughout the electromagnetic spectrum, are found in nature, and are generated both naturally and by human activity. Naturally occurring EMFs include the Earth's magnetic field, static electricity, and lightning. EMFs also are created by the generation, transmission, and distribution of electricity; the use of everyday household electric appliances and communication systems; industrial processes; and scientific research.

EMI occurs when the EMFs produced by a source adversely affect operation of an electrical, magnetic, or electromagnetic device. EMI may be caused by a source that intentionally radiates EMFs (such as a television broadcast station) or one that does so incidentally (such as an electric motor).

Definitions: Electromagnetic Spectrum and Wave

The **electromagnetic spectrum** is the range of waves of electromagnetic energy. It includes static fields such as the earth's magnetic field, radio waves, microwaves, x-rays, and light.

The frequency and wavelength of an **electromagnetic wave** are directly related to each other—the higher the frequency, the shorter the wavelength.

EMFs are described in terms of their frequency, which is the number of times the electromagnetic field increases and decreases its intensity each second. In the U.S., the commercial electric power system operates at a frequency of 60 Hertz (Hz), or cycles per second, meaning that the field increases and decreases its intensity 60 times per second. Electric power system components are typical sources of electric and magnetic fields. These components include generating stations and power plants, substations, high-voltage transmission lines, and electric distribution lines. Even in areas not adjacent to transmission lines, 60-Hz EMFs are present from electric power systems and common building wiring, electrical equipment, and appliances.

Natural and human-generated EMFs cover a broad-frequency spectrum. EMFs that are nearly constant in time are called "dc" (direct current) EMFs. EMFs that vary in time are called "ac" (alternating current) EMFs. AC EMFs are further characterized by their frequency range. Extremely low frequency (ELF) magnetic fields typically are defined as having a lower limit of 3 to 30 Hz and an upper limit of 30 to 3,000 Hz. The HSR overhead contact system (OCS) and power distribution system primarily would generate ELF fields at 60 Hz and at harmonics (multiples) of 60 Hz.

Radio and other communications operate at much higher frequencies, often in the range of 500,000 Hz (500 kilohertz (kHz)) to 3 billion Hz (3 gigahertz (GHz)). Typical radio frequency (RF) sources of EMF include antennas associated with cellular telephone towers; broadcast towers for radio and television; airport radar, navigation, and communication systems; high frequency (HF) and very high frequency (VHF) communication systems used by police, fire, emergency medical technicians, utilities, and governments; and local wireless systems, such as wireless fidelity (WiFi) or cordless telephone.

The strength of magnetic fields often is measured in milligauss (mG), gauss (G), tesla (T), or microtesla (μT). For comparison, earth's ambient magnetic field ranges from 500 to 700 mG dc (0.5 to 0.7 G) (50 to 70 μT) at its surface. Average ac magnetic field levels within homes are approximately 1 mG (0.001 G) (0.1 μT), and measured ac values range from 9 to 20 mG (0.009 to 0.020 G) (0.9 to 2 μT) near appliances (Severson et al. 1988). The strength of an EMF rapidly decreases with distance away from its source; thus, EMFs higher than background levels are usually found close to EMF sources.

Unit Definitions and Conversions

Hertz (Hz)—Unit of frequency equal to one cycle per second

- 1 kilohertz (kHz) = 1,000 Hz
- 1 gigahertz (GHz) = 1 billion Hz

Gauss (G)—Unit of magnetic flux density (intensity) (English units)

- 1 G = 1,000 milligauss (mG)

Tesla (T)—Unit of magnetic flux density (intensity) (International units)

- 1 T = 1 million microtesla (μT)
- 1 G = 100 μT
- 1 mG = 0.1 μT

The information presented in this section primarily concerns EMFs at the 60-Hz power frequency and at radio frequencies produced intentionally by communications or unintentionally by electric discharges. EMFs from the HSR operation would consist of the following:

- Power-frequency electric and magnetic fields from the traction power system, traction power substations (TPSS), emergency generators that provide backup power to the stations in case of a power outage, and utility feeder lines—60-Hz electric fields would be produced by the 25-kV operating voltage of the HSR traction system and 60-Hz magnetic fields would be produced by the flow of currents providing power to the HSR vehicles. Along the tracks, the magnetic fields would be produced by the flow of propulsion currents to the trains in the OCS and rails.
- Harmonic magnetic fields from vehicles—Depending on the design of power equipment in the HSR trains, power electronics would produce currents with frequency content in the kHz range. Potential sources include power conversion units, switching power supplies, motor

drives, and auxiliary power systems. Unlike the traction power system, these sources are highly localized in the trains and move along the track as the trains move.

- RF fields—The HSR system would use a variety of communications, data transmission, and monitoring systems—both on and off vehicles—that operate at radio frequencies. These wireless systems would meet the Federal Communications Commission (FCC) regulatory requirements for intentional emitters (47 C.F.R. Part 15 and FCC DET Bulletin No. 65, *Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields*).

Of these EMFs, the dominant effect is expected to be the 60-Hz ac magnetic fields from the propulsion currents flowing in the traction power system—that is, the OCS and rails.

3.5.2 Laws, Regulations, and Orders

Several organizations have developed guidelines for EMF exposure, including individual states, FCC, Occupational Safety and Health Administration (OSHA), Institute of Electrical and Electronics Engineers (IEEE), American National Standards Institute (ANSI), and American Conference of Governmental Industrial Hygienists (ACGIH). Neither the California government nor the U.S. government has regulations limiting EMF exposure to residences.

EMF exposure guidelines and standards have also been adopted by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) in the ELF and RF frequency bands applicable to HSR emissions. The ICNIRP and the IEEE standards both address EMF exposure by the general public and for the U.S. and abroad (and have been formally adopted by the European Union); the IEEE standards have been identified in the Statewide Program EIS/EIR to assess the potential for health and compatibility effects from anticipated HSR emissions. For occupational exposure, ICNIRP reference values are 1,000 µT for magnetic fields and 8.333 kilovolt/meter (kV/m) for electric fields.

The IEEE Standard C95.6, *IEEE Standard for Safety Levels With Respect to Human Exposure to Electromagnetic Fields, 0-3 kHz,* which is often referenced in the U.S. and has been formally adopted by ANSI, specifies maximum permissible exposure (MPE) levels for the general public and for occupational exposure to extremely low-frequency EMFs, which have frequencies of 0 to 3 kHz. The HSR electrification and traction systems would generate extremely low-frequency EMFs with frequencies of 60 Hz, which is in the range covered by this standard. The IEEE Standard C95.6 exposure levels are presented in Table 3.5-1 and Table 3.5-2 (IEEE 2002). Note that the IEEE exposure levels are recommendations only, not regulations.

Table 3.5-1 IEEE C95.6 Magnetic Field Maximum Permissible Exposure Levels for the General Public

Body Part	Frequency Range (Hz)	B-Field (mG)
Head and torso	20–759	9.04 x 103
	759–3,000	6.87 x 106/f
	60	9.04 x 103
Arms or legs	<10.7	3.53 x 106
	10.7–3,000	3.79 x 107/f
	60	632,000

/f = divide by the frequency
Hz = hertz
IEEE = Institute of Electrical and Electronics Engineers
mG = milligauss

Table 3.5-2 IEEE C95.6 Electric Field Maximum Permissible Exposure Levels for the General Public

Body Part	Frequency Range (Hz)	E Field (v/m)
Whole body	1–368	5,000
	368–3,000	1.84 x 106/f
	60	5,000

/f = divide by the frequency
Hz = hertz
IEEE = Institute of Electrical and Electronics Engineers
v/m = volts per meter

In 2006, ANSI adopted IEEE Standard C95.1 as its standard for safe human exposure to non-ionizing electromagnetic radiation (ANSI/IEEE 2006). The HSR train control and communications systems would use radio signals within the range covered by this standard. The C95.1 Standard specifies MPE levels for whole and partial body exposure to electromagnetic energy. MPE exposure levels are lower at 100 to 300 megahertz (MHz) because the human body absorbs the greatest percentage of incident energy at these frequencies. The MPE standards become progressively higher at frequencies above 400 MHz because the human body absorbs less energy at these higher frequencies. The IEEE C95.1 Standard MPEs are based on RF levels averaged over a 30-minute exposure time for the general public. For occupational exposure, the averaging time varies with frequency from 6 minutes at 450 MHz to 3.46 minutes at 5,000 MHz.

Both the IEEE C95.6 and C95.1 standards specify safety levels for occupational and general-public exposure. For each, the exposure levels are frequency dependent. The general-public exposure safety levels are stricter because workers are assumed to have knowledge of occupational risks and are better equipped to protect themselves (e.g., through use of personal safety equipment). The general-public safety levels are intended to protect all members of the public (including pregnant women, infants, the unborn, and the infirm) from short-term and long-term exposure to electromagnetic fields. The safety levels are also set at 10 to 50 times below the levels at which scientific research has shown harmful effects may occur, thus incorporating a large safety factor (ANSI/IEEE 2006).

OSHA safety standards for occupational exposure to RF emissions are found at 29 C.F.R. Part 1910.97. The OSHA safety levels do not vary with frequency and are less stringent than the equivalent ANSI/IEEE and FCC MPEs, except for occupational exposure to fields with frequencies above 5,000 MHz, where the OSHA MPE is equal to the C95.1 MPE and is two times higher than the FCC MPE. The OSHA MPEs are based on a 6-minute averaging time.

ACGIH provides that occupational exposures should not exceed 10 G (10,000 mG or 1 µT). ACGIH additionally recommends that workers with pacemakers should not exceed 1 G (1,000 mG or 0.1 µT). The ACGIH 10 G guideline level is intended to prevent effects such as induced currents in cells or nerve stimulation. However, the ACGIH guidelines are for occupational exposure, not general-public exposure.

3.5.2.1 Federal

Procedures for Considering Environmental Impacts (64 Fed. Reg. 28545)

These Federal Railroad Administration (FRA) procedures state that an EIS should consider possible impacts from EMF/EMI.

U.S. Department of Transportation, Federal Railroad Administration, 49 C.F.R. Part 236.8, 238.225, 229 Appendix F, and 236 Appendix C

These regulations provide rules, standards, and instructions regarding operating characteristics of electromagnetic, electronic, or electrical apparatus and safety standards for passenger equipment.

U.S. Department of Commerce, Federal Communications Commission, 47 C.F.R. Part 15

Part 15 provides rules and regulations regarding licensed and unlicensed RF transmissions. Most telecommunications devices sold in the United States, whether they radiate intentionally or unintentionally, must comply with Part 15. However, Part 15 does not govern any device used exclusively in a vehicle, including in high-speed rail (HSR) trains.

U.S. Department of Commerce, FCC, Office of Engineering and Technology (OET) Bulletin 65, *Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields* (FCC 1997)

OET 65 provides assistance in evaluating whether proposed or existing transmitting facilities, operations, or devices comply with limits for human exposure to RF fields adopted by FCC (FCC 1997).

U.S. Department of Commerce, FCC, 47 C.F.R. Part 1.1310, *Radiofrequency Radiation Exposure Limits*

FCC regulations at 47 C.F.R. Part 1.1310 are based on the 1992 version of the American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE) C95.1 safety standard. Table 3.5-3 shows MPE contained in the ANSI/IEEE C95.1 and FCC standards at frequencies of 450, 900, and 5,000 MHz, which covers the range of frequencies that may be used by HSR radio systems. FCC MPEs are based on an averaging time of 30 minutes for exposure of the general public and 30 minutes for occupational exposure. As shown in Table 3.5-3, the differences between the ANSI/IEEE C95.1 and FCC MPEs are minor.

Table 3.5-3 Radio Frequency Emissions Safety Levels Expressed as Maximum Permissible Exposure

	ANSI/IEEE C95.1 MPE (mW/cm2)		FCC MPE (mW/cm2)		OSHA MPE (mW/cm2)
Frequency	Occupational	General Public	Occupational	General Public	Occupational
450 MHz	1.5	0.225	1.5	0.3	10
900 MHz	3.0	0.45	3.0	0.6	10
5,000 MHz	10	1.0	5.0	1.0	10

ANSI/IEEE = American National Standards Institute/Institute of Electrical and Electronics Engineers
cm = centimeter
FCC = Federal Communications Commission
MHz = megahertz
MPE = maximum permissible exposure
mW = milliwatt
OSHA = Occupational Safety and Health Administration

U.S. Department of Labor, OSHA, 29 C.F.R. Part 1910.97, *Nonionizing Radiation*

29 C.F.R. Part 1910.97 provides safety standards for occupational exposure to RF emissions in the 10-MHz to 100-GHz range. Table 3.5-3 shows MPEs contained in the OSHA standards. The OSHA safety levels do not vary with frequency and are less stringent than the equivalent ANSI/IEEE and FCC MPEs, except for occupational exposure to fields with frequencies above 5,000 MHz where the OSHA MPE is equal to the C95.1 MPE and is two times higher than the FCC MPE. The OSHA MPEs are based on averaging over any 6-minute time interval.

3.5.2.2 State

California High-Speed Rail Authority—Electromagnetic Compatibility Program Plan

The Electromagnetic Compatibility Program Plan (EMCPP) defines the project's High-Speed Transport Protocol Electromagnetic Compatibility (EMC) objective, which will provide for electromagnetic compatibility of HSR equipment and facilities with themselves, with equipment and facilities of the HSR's neighbors, and with passengers, workers, and neighbors of the HSR. The EMCPP will also guide and coordinate the EMC design, analysis, testing, documentation, and certification activities among HSR project management, systems, and sections through the project phases; conform to the EMC-related HSR system requirements; and comply with applicable regulatory requirements, including EMC requirements in 49 C.F.R. Part 200-299 for the HSR systems and sections (Authority 2010a).

California Department of Education, California Code of Regulations, Title 5, Section 14010(c)

This section sets minimum distances for siting school facilities from the edge of power line easements: 100 feet for 50- to 133-kV line, 150 feet for 220- to 230-kV line, and 350 feet for 500- to 550-kV line.

California Public Utilities Commission Decision D.93-11-013

The California Public Utilities Commission (CPUC) decision adopted a policy regarding EMF from regulated utilities.

California Public Utilities Commission Decision D.06-01-042

The CPUC decision updates the EMF policy originally defined in D.93.11.013.

California Public Utilities Commission EMF Guidelines for Electrical Facilities

These CPUC guidelines, based on D.93-11-013 and D.06-01-042, establish priorities between land use classes for EMF mitigation.

While the CPUC decisions, general orders, and guidelines do not directly apply to the HSR, they are listed because:

- The project will handle potential environmental impacts of the HSR project TPSS and associated electric power substations, station switches, and high-voltage transmission lines consistent with CPUC D.93-11-013, D.06-01-042.
- Decision D.06-01-042 reaffirms the key elements of the updated EMF policy.

3.5.2.3 Regional and Local

EMF- and EMI-related topics are discussed in some county and municipal general plans and ordinances, typically as guidance or policy. The EMI and EMF guidance in these plans and ordinances generally is derived from the federal and state regulations listed above.

Compile a complete inventory of adopted local and regional plans, ordinances, or guidelines related to EMF/EMI. Use a tabular format similar to the *Fresno to Bakersfield Section Final*

EIR/EIS, or more recent HSR project EIR/EIS, to organize and concisely report this information. This information will become part of Volume 2 Appendix 3.1-B Regional and Local Policy Inventory.

3.5.3 Regional and Local Policy Analysis

The overall structure of this discussion is presented in Section 3.0.3, Regional and Local Policy Analysis. As described in more detail in subsection 3.0.3.2, this analysis will describe any inconsistency or conflict with adopted regional or local policies and implementation of the HSR project.

3.5.4 Methods for Evaluating Impacts

Evaluation of impacts on EMF/EMI is a requirement of the federal and state regulations summarized in Sections 3.5.2.1 and 3.5.2.2, California Environmental Quality Act (CEQA), and National Environmental Policy Act (NEPA). Each project EIR/EIS shall consider adjacent railroads and rail transit systems, airports, schools, day care centers, hospitals, clinics, medical facilities, residential areas, commercial industrial areas, and agricultural operations (farms) in the corridor based on information from local agencies, maps, photographs, database searches, and site surveys. In addition, the project EIR/EIS shall describe prior and on-going efforts to avoid EMF/EMI impacts on adjacent existing railroad and rail transit signal systems and airports; potential for corrosion of adjacent metallic structures, underground pipelines, and cables; nuisance shocks; and including reference to impact avoidance and minimization features described in Section 2.5.2, HSR Build Alternatives. This section describes the methodology for developing the resource study area (RSA) and for evaluating effects under CEQA and NEPA. Subsequent sections in this method provide direction for the design of mitigation measures and the structure for presenting content related to EMF/EMI in the EIR/EIS documents.

3.5.4.1 Definition of Resource Study Area

The RSA is the area in which all environmental investigations specific to EMF/EMI are performed to determine the resource characteristics and potential impacts of the project segment. The factors making up the RSA and the description of the elements comprising the RSA are provided in Section 3.0.4.1, Definition of Resource Study Area, and Section 3.0.4.2, Methodology for Impact Analysis.

The boundaries of the RSA for EMF/EMI extend beyond the project footprint. The EMF/EMI impact analysis focuses on the effects of source EMI/EMF on sensitive receivers. Sensitive EMI/EMF receivers are adjacent railroads and rail transit systems, airports, residential dwellings, schools, hospitals, clinics, medical facilities, commercial and industrial facilities, and agricultural operations (farms). For direct EMF/EMI impacts on sensitive receivers, the study area is the project footprint, as described in Chapter 2, Alternatives, plus 500 feet from the proposed track centerline, 500 feet from the perimeter of the alternative heavy maintenance facility (HMF) sites, and 500 feet on both sides of the proposed HSR right-of-way centerline (a 1,000-foot-wide strip) from the TPSS for each HSR Alternative. This study area has been determined based on typical screening distances (Table 3.5-4) as defined by HSRA TM 300.07, EIR/EIS Assessment of CHSR *Alignment EMF Footprint* (Footprint Report)[1], Section 2.5, and project-specific factors of the HSR project. Screening distances indicate whether any EMF/EMI-sensitive receivers are near enough to the proposed alignment for EMF/EMI impact to be possible under typical conditions. If receivers are located farther than these screening distances, TM 300.07 has determined that impacts would be unlikely.

[1] See Authority website, at www.hsr.ca.gov/docs/programs/eir_memos/Proj_Guidelines_TM300_07R00.pdf

Modify the previous paragraph as required to fully describe the RSA for EMF/EMI. The specific setting or features of an HSR project section may indicate a broader RSA is appropriate. The analyst for this chapter therefore must use judgment to determine whether a broader RSA may be justified based on specific facts. A primary reason for extending the study area for direct EMF/EMI impacts farther than the typical screening distances is the potential for sensitive equipment susceptible to EMF/EMI conditions within the study area. Consider the particular EMF/EMI context, the characteristics of HSR-generated EMF/EMI, the amount of design information, and level of design detail to ensure that the RSA will be sufficient for each HSR project section.

Table 3.5-4 Resource Study Area Information

Required Information	Resource Study Area
▪ Electromagnetic Compatibility Control Plan (EMCCP) ▪ Technical features (e.g., frequency, field strengths, modulation system) of the HSR traction power system, right-of-way-to-train wireless communications system, and other sources of EMF/EMI ▪ Location of substations and transmission lines ▪ Aerial maps ▪ Geographic Information System (GIS) base map ▪ Project description—HSR system, linear and sited facilities, stations, operations, ancillary improvements ▪ Project plans and profiles, other design materials in sufficient detail to complete environmental impact assessment of all proposed improvements and operations within the affected geographic area ("project footprint") – Design elements include the HSR project and related facilities, temporary access and construction/staging areas, utility improvements, connections, and interconnections to public utilities providing power, along with any modifications or additions to the utility facilities, etc. ▪ Station locations and footprints in sufficient detail to complete environmental impact assessment of all construction and operations, regardless of implementation or operating entity ▪ Construction phases and interim build conditions/transitions for all project and ancillary improvements, and stations ▪ Right-of-way data showing parcel acquisitions ▪ Local and regional land use plans and other relevant land use documents	▪ For direct impacts on EMFs/EMI, the RSA is at least the project footprint, as described in Chapter 2, extended as necessary and directed in Section 3.0.4.1. ▪ Indirect impacts on EMF/EMI may occur in an RSA that extends beyond the project footprint, such as susceptible neighbor equipment as defined in TM 300.07. ▪ Refer to other sections of the EIR/EIS as appropriate for impacts related to or influencing EMF/EMI ▪ The study area for EMF and Radio Frequency Interference (RFI) is on either side of the planned track, as described in Section 6.3.2 of the *Draft Environmental Impact Report/ Environmental Impact Statement Assessment of California High-Speed Train Alignment Electromagnetic Field Footprint* prepared by Turner Engineering in July 2010 (Authority 2010). The study area is as follows: – 500 feet on both sides of the proposed HSR right-of-way centerline (a 1,000-foot-wide strip centered on the proposed HSR alignment) for each HSR Alternative – 500 feet from the perimeter of the alternative heavy maintenance facility (HMF) sites – 500 feet on both sides of the proposed HSR right-of-way centerline (a 1,000-foot-wide strip) from the transmission lines supplying power substations (TPSS) for each HSR Alternative ▪ The analyst will expand the EMF/EMI RSA as needed in response to setting conditions, project characteristics or analytical findings.

Table 3.5-4 groups screening distances by the type of setting the project would occupy, physical infrastructure, and type of EMF/EMI emission. These screening distances are based on analysis performed in TM 300.07 and the *Draft Environmental Impact Report/Environmental Impact Statement Assessment of California High-Speed Train Alignment Electromagnetic Field Footprint* prepared by Turner Engineering in July 2010 (Authority 2010).

Table 3.5-4 presents the required information sources and baseline screening distances to help define the RSA.

The resource study area for cumulative effects will be a broader area depending on the project section and will consider adjacent HSR project sections to ensure a broad consideration of impacts on a more regional and statewide basis. See Section 3.19, Methodology for Cumulative Impacts, for a more detailed discussion.

3.5.4.2 Methodology for Impact Analysis

Group and consolidate information and discussion in the EIR/EIS to effectively present content to the lay audience (i.e., by distinct resource characteristic or component, such as EMF or EMI impacts). Present detailed information on EMFs, railroad modifications, crossings, and closures as a result of the proposed HSR alternatives in the EIR/EIS Volume 2 appendix associated with this resource, with specific reference to the appendix provided in the EMF/EMI subsection in Chapter 3 to help the reader navigate between volumes.

Begin analysis of impacts with consideration of impact avoidance and minimization features that are incorporated into the project in Section 2.5.2, HSR Build Alternatives, and evaluated in Volume 2, Appendix 2-E. Account for implementation of avoidance and minimization features or best management practices, such as during the planning stage through system design, the Authority will perform EMC/EMI safety analyses, which will include identification of existing nearby radio systems, design of systems to prevent EMI with identified neighboring uses, and incorporation of these design requirements into bid specifications used to procure radio systems.

Refer to a summary table of impact avoidance and minimization features and explain how particular features avoid impacts or ensure less-than-significant EMF/EMI impacts.

Analyze direct and indirect impacts related to EMF/EMI using quantitative analysis and, where necessary, using qualitative analysis. Analyze impacts which may occur during construction and operation of the HSR system (*Note*: the analytical results for construction impacts and operations impacts are presented separately in the EIR/EIS). Table 3.5-5 identifies types of construction and operation impacts.

Apply the same impact thresholds in both project timeframes. Use professional judgment when considering the context and intensity of an effect to determine the significance of impacts. All relevant aspects of context (e.g., existing resource conditions, resource sensitivity) and appropriate factors of intensity (e.g., extent of change, duration of change) must be considered for determining impact significance. Also consider project actions that improve or otherwise benefit EMF/EMI values in the evaluation of impact significance.

Base the analysis on a review of available reports and data (including federal and state statutes and regulations, resource agency, local, and regional agency policies and ordinances), discussions with agency representatives in the region, field investigation, modeling (where applicable), and professional judgment. Develop GIS databases for each project segment. Develop all GIS data (1) as part of project design or (2) from available federal, state, and local sources. This information must have sufficient detail to allow complete analysis of the anticipated design of the completed project or of reasonable assumptions for project implementation, including adjacent railroads, rail transit systems, and airports; schools, day care centers, hospitals, clinics, medical facilities, residential areas, commercial and industrial facilities, and agricultural operations (farms); and on adjacent parallel metal structures, such as pipelines or fences, and all electrical and utility connections or modifications. Focus analysis on the project's potential to alter existing

conditions of the affected resources in the RSA(s). Identify where permit applications will be needed and provide analysis to support future permit review.

Table 3.5-5 Source and Description of EMF/EMI Impacts

Source of Impacts	Description of Impacts
Construction activities with potential for impacts to EMF/EMI due to temporary or permanent physical change on the landscape by project facilities, such as the stations, traction power substations, Overhead Catenary System (OCS), support facilities, and columns supporting elevated structures	▪ Potential EMFs generated by construction equipment ▪ Potential EMFs from HSR traction power facilities
Operational impacts result from either ongoing rail service and maintenance activities of the HSR system	▪ Potential EMFs from HSR traction power facilities ▪ Potential EMFs from HSR OCS and power distribution systems (e.g., transmission lines from substations connecting to the utility grid) ▪ Potential EMI/RFI from HSR equipment, including rolling stock, communications equipment and wayside equipment ▪ Potential EMI/RFI from passenger communications and computing equipment

Methods for measuring radiated electric fields and magnetic fields, and instructions for assessing impacts, are provided in TM 300.07 and the *Draft Environmental Impact Report/Environmental Impact Statement Assessment of California High-Speed Train Alignment Electromagnetic Field Footprint prepared by Turner Engineering in July 2010* (Authority 2010). The HSR regional consultant (RC) should use these methods to measure magnetic and electric fields in each section, apply the EMF footprint to its section alignment, assess the potential impact of the HSR EMF footprint on neighbors, and develop the section EMC Impact Assessment portions of the EIR/EIS Reports. Also include review of the data and impact analyses in the other sections prepared for the EIR/EIS, including Safety and Security, Station Planning, Land Use, and Development, Agricultural Lands, and Regional Growth.

Identify representative land uses that could be affected by the EMFs resulting from HSR operations and predict HSR EMF levels for those land uses. The assessment should include sites not be expected to be affected by HSR operations, which serve as "control" sites. Prepare a detailed map of sufficient scale to illustrate the geographic relationship of the alternatives to EMF/EMI. The map boundary shall not exceed the extent of a project segment, and must clearly show the location and areal extent of project impacts and major landscape features (e.g., highways, major roads, local jurisdictions, perennial water bodies, or other geographical landmarks or features that convey relative location and size). Obtain Authority, FRA and PMT concurrence on mapping scale before preparing an administrative draft EIR/EIS.

The following language from the *Fresno to Bakersfield Section Final EIR/EIS* explains the process and should be followed for the analysis.

- Maps, surveys, photographs, and database searches was used to identify land uses in the HSR Section that might be susceptible to the EMFs produced by an HSR. Such uses included universities, medical institutions, high-tech businesses, and governmental facilities that use equipment that could be affected by new sources of EMFs. Baseline measurements of EMFs were made in accordance with technical guidance developed by the Authority and FRA at selected measurement locations to establish EMF levels representative of existing conditions along the HSR Section. Using these targeted areas, the reconnaissance described above

identified sensitive land uses. Appendix 3.5-A, Technical Study: Pre-Construction Electromagnetic Measurement Survey of [XX] Locations along the HSR Section, describes the measurement sites and discusses the existing EMF levels that potentially could cause EMI at the measurement sites.

- A mathematical model of the HSR traction electrical system was used to calculate the anticipated maximum 60-Hz magnetic fields that a single HSR train would produce. The model incorporates conservative assumptions for the potential EMF impacts of the HSR. For example, the projected maximum magnetic fields would exist only for a short time and only in certain locations as the train moves along the track or changes its speed and acceleration. The magnetic field levels decline rapidly as lateral distance from the tracks increases. For most locations and most times, "exposure" to EMFs would not be as great as predicted by the model, which gives peak levels. The EMF model uses a 220-mph speed assumption. The worst-case conditions for magnetic fields would be short term because train current is not always at a peak level, depending on train speed and acceleration, and because currents split between two tracks, between contact wire and negative feeder, and between front and rear power stations as the train travels down the line. The model identifies how the projected maximum EMF levels vary with lateral distance from the centerline of the tracks. The *Draft Environmental Impact Report/Environmental Impact Statement Assessment of California High-Speed Train Alignment Electromagnetic Field Footprint* (Footprint Report) describes the modeling methodology and discusses the modeling results for a single-train HSR.
- For the identified sensitive land uses from the field reconnaissance, maximum EMF levels emitted by the HSR system were predicted and compared to the measured, existing ambient conditions. Because magnetic fields are expected to be the dominant EMF effect from HSR operation,[2] these calculation results serve as the basis for the EMF impact analysis. Impacts were identified based on the difference between the predicted EMF levels and the existing conditions. Where the predicted magnetic fields are comparable to or lower than the typical levels, no adverse impact would occur, and these locations were screened out. Where the predicted magnetic fields are higher than typical levels for exposure, then the potential for EMI is used to evaluate whether adverse impacts could be expected.

For all impacts, determine significance of impacts under NEPA and CEQA based on application of the following methods.

3.5.4.3 Method for Determining Significance under NEPA

NEPA does not define EMF/EMI thresholds as described in more detail in Section 3.0.4.3. Use professional judgment when considering the resource context, the intensity, and the duration of the potential effect to determine whether an impact is significant or less than significant.

3.5.4.4 Method for Determining Significance under CEQA

Based on CEQA Guidelines, the project would have a significant impact if it would:

- Expose a person to an EMF health risk, including a field intensity over the limit of an applicable standard, an electric shock, or interference with an implanted biomedical device
- Disrupt agricultural activities near the HSR
- Interfere with nearby sensitive equipment, including at hospitals, industrial and commercial facilities, railroads, rail transit systems, or airports

Human exposure and interference may be defined as follows:

[2] The HSR OCS and distribution systems primarily would have 60-Hz magnetic fields.

- Human Exposure—The MPE limit (IEEE Standard C95.6, Table 2) for 60-Hz magnetic fields for the instantaneous exposure of the general public is 9.04 G (904 μT); the MPE for controlled environments where only employees are present is 27.12 G (2,712 μT). The MPE limit (IEEE Standard C95.6, Table 4) for 60-Hz electric fields for the general public is 5,000 volts per meter (V/m), or 5 kV/m. The MPE is 20 kV/m for controlled environments in which only HSR employees would work.
- Interference—The Footprint Report provides typical interference levels for common types of sensitive equipment. These reported levels are used as the significance criteria for this impact analysis. From the Footprint Report, 2 mG is a screening level for potential disturbance to unshielded sensitive equipment. In addition, 2 mG is a typical EMF level from early epidemiological studies, which showed that it is the lowest level of chronic, long-term magnetic field exposure with no statistical association with a disease outcome (Savitz et al. 1988; Severson et al. 1988). The value of 2 mG also is a typical EMF level emitted from household appliances (Authority 2010b).

3.5.5 Affected Environment

Include a concise summary description of existing airports, railroads, rail transit systems, schools, hospitals, licensed day care centers, commercial and industrial facilities, and agricultural operations, and susceptible structures along the proposed HSR alignments and at proposed HSR facilities. In particular:

- Identify sensitive equipment, such as medical imaging equipment, or signaling systems on adjacent railroads and rail transit systems. A map may be created to illustrate the locations of sensitive equipment or railroad and rail transit signal systems, alternatives, and proposed mitigation measures.
- Document established local policies concerning EMF/EMI from new utility power substations, power lines, and communication towers.
- Describe pertinent stakeholder issues and concerns from public outreach efforts and personal contact with local agencies.
- Cross-reference all sections of the EIR/EIS (by lowest heading tier, e.g., 3.X.X) that describe the resources or are related to EMF/EMI (e.g., Transportation; Station Planning, Land Use and Development; Public Utilities and Energy; Agricultural Lands; Safety and Security; Regional Growth).

Table 3.5-6 through Table 3.5-9 provide key information needed for a complete description of the Affected Environment and typical sources for the information.

Table 3.5-6 Populations near High-Voltage Transmission Lines

Key Information	Sources of Information
▪ Occupied structures within zone of potential EMF effects from substations and proposed high-voltage transmission/distribution lines connecting HSR substations to the electric power grid, including universities, medical institutions, high-tech businesses, and governmental facilities, etc. ▪ Schools, hospitals, airport, military facilities, railroads, telecommunications, research labs, or other facilities with possibly greater sensitivity to EMI impacts	▪ Aerial images, maps, database searches, and field review for identification of structures and facilities ▪ Existing local planning documents for identification/location of sensitive receptors (e.g., schools, hospitals, etc.)

Table 3.5-7 Telecommunication and Other Sensitive Facilities Susceptible to EMF/EMI/RFI Effects

Key Information	Sources of Information
Telecommunication, medical, industrial, commercial, research, and other sensitive facilities susceptible to EMF/EMI/RFI effects	Field review and aerial images, map facilities along alignment corridor, and transmission lines

Table 3.5-8 Railroad/Transportation Equipment Susceptible to EMF/EMI/RFI Effects from Airports, Military, or Other Commercial Transmitters along the ROW

Key Information	Sources of Information
Railroad/transportation equipment susceptible to EMF/EMI/RFI effects from airports, military, or other commercial transmitters along the ROW	Field review and aerial images

Table 3.5-9 Typical Effects of HSR-Related EMF/EMI/RFI

Key Information	Sources of Information
Typical effects of HSR-related EMF/EMI/RFI	Program EIR/EIS

Include a graphic showing EMI/EMF measurement sites and a data table. For an example report about EMI/EMF measurement sites, refer to the document *Appendix 3.5-A, Technical Study: Pre-Construction Electromagnetic Measurement Survey of 10 Locations Along the Fresno to Bakersfield Section* prepared for the *Fresno to Bakersfield Section Final EIR/EIS.*

3.5.6 Environmental Consequences

General formatting and terminology for constructing the discussion of environmental consequences is provided in Section 3.0.6, Environmental Consequences. The following direction is specific to the evaluation of EMF/EMI. The heading structure for the EMF/EMI EIR/EIS discussion is shown in Section 3.5-16.

Give each impact a short description, and number, e.g., *EMF/EMI Impact #1: EMFs associated with HSR traction power substations may generate EMI that can affect facilities with sensitive instruments or medical equipment.* Explain the results of the analysis prescribed in the Methods for Evaluating Impacts subsection. Simplify impact discussions whenever possible with references or citations to the more detailed information in the appendices. Use tables whenever possible to summarize the impacts and simplify the text.

The NEPA and CEQA assessments shall reach specific, separate conclusions about significance for each impact based on the significance criteria and methods defined in the NEPA and CEQA subsections of the Methods for Evaluating Impacts subsection. For example, the permanent construction of the traction electrification system, including overhead contact system and traction power facilities for the through-town alignment, will introduce a substantial EMF/EMI source to the existing built environment which may interfere with unshielded sensitive industrial and medical equipment at nearby medical facilities. Certain types of medical diagnostic equipment are particularly vulnerable to interference from external EMF/EMI. Under CEQA, if such an impact occurred, it would be considered a significant impact due to substantial performance degradation of the sensitive equipment. The impact may also be significant under NEPA due to potential for increased EMF/EMI levels or proximity to sensitive uses such as hospitals with biomedical devices or other facilities with sensitive medical diagnostic equipment, the sensitivity of these resources

to EMF/EMI impacts, the geographic range of EMF/EMI levels, and the magnitude and timing of EMF/EMI increases that coincide with sensitive equipment use.

3.5.7 Mitigation Measures

General formatting and terminology for constructing the discussion of mitigation measures is provided in Section 3.0.7, Mitigation Measures. The following direction is specific to EMF/EMI. Present the mitigation measures associated with project alternatives within each geographic segment under the subheadings of Construction and Operations. The heading structure for the EMF/EMI EIR/EIS discussion is shown in Section 3.5.11. Give each mitigation measure a short descriptive title and a number, such as *EMF/EMI-MM#1*, that corresponds to the primary significant impact for which the measure is proposed (if practical).

Develop project-level measures that are consistent with adopted program and project strategies that avoid or minimize impacts. Begin by considering programmatic mitigation strategies described in Section 3.0.7, as well as the following resource-specific guidance, as applicable to the HSR project section:

- The EMF/EMI-related technical reports and environmental document sections in the most recent environmental documents produced by the Authority (e.g., *Fresno to Bakersfield Section Final EIR/EIS*, or more recent HSR project EIR/EIS)
- CEQA Findings of Fact and the Record of Decision for previously adopted project-level high-speed rail project documents

Refine general mitigation strategies into project-level, project-specific mitigation measures that are coupled to project-specific impacts. Design specific mitigation measures to address any significant EMF/EMI effects, such as shielding to protect sensitive equipment or grounding to prevent nuisance shocks.

Draft the mitigation measures to facilitate transition into the Mitigation Monitoring and Enforcement Plan (MMEP) by identifying responsibility and timing for implementation, as appropriate. For example, the project will implement EMF/EMI mitigations, by identifying nearby companies and medical facilities which may contain sensitive equipment. If necessary, the project will work with the owners of the nearby affected facilities to construct shielding to protect the equipment from EMF/EMI. The shielding will be designed as a part of final project design. The EMF/EMI shielding will be installed as part of the HSR project, but before energizing the HSR TPSS, OCS, trains, and communication antennas in the segment.

3.5.8 Impacts from Implementing Mitigation Measures

General guidance for constructing the discussion of impacts from implementing mitigation measures is provided in Section 3.0.8, Impacts from Implementing Mitigation Measures.

Mitigation measures can cause both positive and negative impacts that must be disclosed and considered as part of the environmental analysis. For example, building a structure to shield susceptible equipment ensures maintenance of low EMF/EMI (beneficial effect) would result in a construction project for a neighbor (possibly adverse effect). Another example is the modification of an adjacent metallic structure, such as a fence or pipeline, to prevent corrosion and nuisance shocks. In this case, make reasonable assumptions about the potential amount and type of construction required, and note the impacts caused by the construction project, such as disruption of service, increases in maintenance or other service demands, changes to adjacent structure performance or appearance (may be positive or negative).

Evaluate all mitigation measures, including off-site measures, using the methods in Section 0. Determine probable impacts using actual, on-the-ground analysis and describe the substantial basis for analytical conclusions (including defined thresholds or other criteria). When the impacts of mitigation measures cannot be quantified (e.g., at a specific location, in a definite extent, at a

particular time or duration, or measurable alteration of the affected resource), evaluate potential impacts using clearly described assumptions based upon reasonably foreseeable outcomes.

3.5.9 Impacts Summary

3.5.9.1 NEPA Impacts

The overall structure and content of this discussion is presented in Section 3.0.9.1, NEPA Impacts. The heading structure for this organizational scheme is shown in Section 3.5.11. Use maps, as appropriate, to show locations of significant impacts of alternatives by segment.

3.5.9.2 CEQA Significance Conclusions

The project would comply with applicable federal and state regulations and would implement the design strategies outlined in the *Final Program EIR/EIS for the Proposed California HST System* (Authority and FRA 2005). The overall structure and content of this discussion is presented in Section 3.0.9.2, CEQA Significance Conclusions. The heading structure for this organizational scheme is shown in Section 3.5.11 of this method. Use maps, as appropriate, to show locations of significant unavoidable impacts of alternatives by segment.

3.5.10 Products

The RC is responsible for preparing the following products, under Authority and Federal Railroad Administration direction, according to PMT guidance and subject to PMT quality control and assurance.

3.5.10.1 Technical Report or Appendix

In addition to the Volume 1 impacts analysis chapter, provide technical reports and Volume 2 appendices where full analysis applicable to the HSR project section requires details in excess of efficient inclusion in the EIR/EIS Volume 1 chapter. For example:

1. Volume 2, Appendix 2-E, Project Impact Avoidance and Minimization Features Analysis
2. Volume 2, Appendix 3.1-B Regional and Local Policy Inventory
3. Volume 2, Appendix 3.5-A Technical Study: Pre-Construction Electromagnetic Measurement Survey of Locations along the HSR Section
4. EMF/EMI-related Technical Report

3.5.10.2 Project EIR/EIS Volume 1

1. Summary/Table for EIR/EIS Executive Summary
2. Project Description—EMF/EMI-related Components
    a. Impact Avoidance and Minimization Features
    b. Summary Table of Impact Avoidance and Minimization Features, and Project Impacts
3. Affected Environment, Environmental Consequences and Mitigation Measures Section: EMF/EMI
4. Affected Environment, Environmental Consequences and Mitigation Measures Section: Cumulative Impacts

3.5.11 Electromagnetic Fields and Electromagnetic Interference EIR/EIS Outline

The RC shall use the following outline for organizing content related to EMF/EMI in Chapter 3 of the project EIR/EIS, using the heading hierarchy and format as indicated. The RC shall consider the impacts of implementing mitigation measures in Section 3.5.7.

- 3.5 Electromagnetic Fields and Electromagnetic Interference
  - 3.5.1 Introduction
  - 3.5.2 Laws, Regulations and Orders
    - 3.5.2.1 Federal
    - 3.5.2.2 State
    - 3.5.2.3 Regional and Local
  - 3.5.3 Regional and Local Policy Analysis
  - 3.5.4 Methods for Evaluating Impacts
    - 3.5.4.1 Definition of Resource Study Area
    - 3.5.4.2 Method for Determining Significance under NEPA
    - 3.5.4.3 Method for Determining Significance under CEQA
  - 3.5.5 Affected Environment
    - 3.5.5.1 Project Segment 1
      - Alternative 1
      - Alternative 2
      - Alternative 3
      - Alternative N
    - 3.5.5.2 Project Segment 2
      - Alternative 1
      - Alternative 2
      - Alternative 3
      - Alternative N
    - 3.5.5.3 Project Segment 3
      - Alternative 1
      - Alternative 2
      - Alternative 3
      - Alternative N
    - 3.5.5.4 Project Segment N
      - Alternative 1
      - Alternative 2
      - Alternative 3
      - Alternative N
  - 3.5.6 Environmental Consequences
    - 3.5.6.1 Overview
    - 3.5.6.2 Project Segment 1
      - No Project
      - Alternative 1
        - Construction Impacts
        - Operations Impacts
      - Alternative 2
        - Construction Impacts
        - Operations Impacts
      - Alternative 3
        - Construction Impacts
        - Operations Impacts
      - Alternative N
        - Construction Impacts
        - Operations Impacts

3.5.6.3 Project Segment 2
No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.5.6.4 Project Segment 3
No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.5.6.5 Project Segment N
No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.5.7 Mitigation Measures
3.5.7.1 Project Segment 1
Alternative 1
Common Measures
Construction Measures
Operations Measures
Alternative 2
Common Measures
Construction Measures
Operations Measures

Alternative 3
Common Measures
Construction Measures
Operations Measures
Alternative N
Common Measures
Construction Measures
Operations Measures

3.5.7.2 Project Segment 2
Alternative 1
Common Measures
Construction Measures
Operations Measures
Alternative 2
Common Measures
Construction Measures
Operations Measures
Alternative 3
Common Measures
Construction Measures
Operations Measures
Alternative N
Common Measures
Construction Measures
Operations Measures

3.5.7.3 Project Segment 3
Alternative 1
Common Measures
Construction Measures
Operations Measures
Alternative 2
Common Measures
Construction Measures
Operations Measures
Alternative 3
Common Measures
Construction Measures
Operations Measure
Alternative N
Common Measures
Construction Measures
Operations Measures

3.5.7.4 Project Segment N
Alternative 1
Common Measures
Construction Measures
Operations Measures
Alternative 2
Common Measures
Construction Measures
Operations Measures

3.6 Public Utilities and Energy

The methodology guidelines in this section are organized by a sequence of steps for preparing an environmental document. Section 3.6.11 provides an outline for this environmental impact report/environmental impact statement (EIR/EIS).

Section 3.0, General Methodology Guidance for Resource Sections, provides the methodological framework common to the evaluation of all resource areas. Information regarding public utilities and energy is may be provided in Section 3.2, Transportation (Sections 3.2.5 and 3.2.8); Section 3.5, Electromagnetic Fields and Electromagnetic Interference (Sections 3.5.1 and 3.5.5); Section 3.8, Hydrology and Water Resources (Section 3.10, Hazardous Materials and Wastes (Section 3.10.4); Section 3.13, Station Planning, Land Use, and Development (Section 3.13.5); and Section 3.14, Agricultural Lands (Section 3.14.5). Use these sections in combination with this Public Utilities and Energy guidance section when conducting the analyses and preparing documentation for the EIR/EIS.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the resource section. Example text that illustrates the concepts and methods is shown in *italics*. The methods are organized to mirror the organization of the EIR/EIS section or chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

If there is a discrepancy between the material in this guidance and any adopted federal and state agency guideline or manual applicable to public utilities or energy, the agency guideline or manual controls. For example, recent updates of agency guidelines may introduce new requirements not anticipated during HSR preliminary engineering. The new requirements would take precedence over the previous information and would have to be incorporated into the project. Identify and discuss any such discrepancy with the California High-Speed Rail Authority (Authority), Federal Railroad Administration (FRA), and the Program Management Team (PMT) before deviating from this guidance.

3.6.1 Introduction

The general method for preparing an introduction for this resource section is provided in Section 3.0.1, Introduction. The following discussion presents direction specific to Public Utilities and Energy.

Refer specifically to related content in other sections of the EIR/EIS that influence or are influenced by the public utilities and energy impact analysis (e.g., transportation; electromagnetic fields and electromagnetic interference; hydrology and water resources; hazardous materials and wastes; station planning, land use, and development; and agricultural lands) and supportive/associated technical documents. References to other documents must include citations to specific sections (by lowest heading tier (e.g., 3.X.X)), not just a general reference to a chapter in the EIR/EIS.

3.6.2 Laws, Regulations, and Orders

Federal, state, and local laws, regulations, orders, plans, or industry standards relevant to public utilities and energy in the geographic area that is affected by the project as presented below. General NEPA and CEQA requirements for assessment and disclosure of environmental impacts are described in Section 3.1, Introduction, so these do not need to be restated in the resource section of the chapter.

3.6.2.1 Federal

Procedures for Considering Environmental Impacts (64 Fed. Reg. 28545)

These Federal Railroad Administration (FRA) procedures state that an EIS should consider possible impacts on energy production and consumption, especially those alternatives likely to reduce the use of petroleum or natural gas consistent with the policy outlined in Executive Order (USEO) 12185.

Section 403(b) of the Power Plant and Industrial Fuel Use Act (USEO 12185; 44 Fed. Reg. § 75093; Public Law 95-620)

This section of the Power Plant and Industrial Fuel Use Act and of the USEO encourages additional conservation of petroleum and natural gas by recipients of federal financial assistance.

Norman Y. Mineta and Special Programs Improvement Act (Public Law 108-426)

This act, established by the United States Department of Transportation, Pipeline, and Hazardous Materials Safety Administration, regulates safe movement of hazardous materials to industry and consumers by all modes of transportation, including pipelines. The regulations require pipeline owners and operators to meet specific standards and qualifications, including participating in public safety programs that *notify an operator of proposed demolition, excavation, tunneling, or construction near or affecting a pipeline*. This includes identifying pipelines that may be affected by such activities and identifying any hazards that may affect a pipeline. In California, pipeline safety is administered by the Office of the Fire Marshal.

Federal Energy Regulatory Commission

The Federal Energy Regulatory Commission (FERC) is an independent agency that regulates the interstate transmission of natural gas, oil, and electricity. FERC also regulates natural gas and hydropower projects. As part of that responsibility, FERC regulates the transmission and sale of natural gas for resale in interstate commerce, the transmission of oil by pipeline in interstate commerce, and the transmission and wholesale sales of electricity in interstate commerce. FERC also licenses and inspects private, municipal, and state hydroelectric projects; approves the siting and abandonment of interstate natural gas facilities, including pipelines, storage, and liquefied natural gas; oversees environmental matters related to natural gas and hydroelectricity projects and major electricity policy initiatives; and administers accounting and financial reporting regulations and conduct of regulated companies.

Corporate Average Fuel Economy

Corporate Average Fuel Economy standards are federal regulations that are set to reduce energy consumed by on-road motor vehicles. The National Highway Traffic Safety Administration regulates the standards, and the U.S. Environmental Protection Agency (USEPA) measures vehicle fuel efficiency. The standards specify minimum fuel consumption efficiency standards for new automobiles sold in the United States. The current standard is 34.9 miles per gallon (mpg) for passenger cars and 26.6 mpg for light-duty trucks. On May 19, 2009, President Obama issued a Presidential Memorandum proposing a new national fuel economy program that adopts uniform federal standards to regulate both fuel economy and greenhouse gas emissions. The program covers model year 2012 to model year 2016 and ultimately requires an average fuel economy standard of 35.5 mpg in 2016 (39 mpg for cars and 30 mpg for trucks). In response to the Presidential Memorandum, an October 2010 Regulatory Announcement developed with support from industry, the State of California, and environmental stakeholders was issued by the USEPA and the U.S. Department of Transportation.

Resource Conservation and Recovery Act (42 U.S.C. § 6901 et seq.)

The federal Resource Conservation and Recovery Act (RCRA) enacted in 1976 to ensure that solid and hazardous wastes are properly managed, from their generation to ultimate disposal or destruction. Implementation of RCRA has largely been delegated to federally approved state waste management programs and, under Subtitle D, further promulgated to local governments for management of planning, regulation, and implementation of nonhazardous solid waste disposal. The USEPA retains oversight of state actions under 40 C.F.R. Part 239-259. Where facilities are found to be inadequate, 40 C.F.R. Part 256.42 requires that necessary facilities and practices be developed by the responsible state and local agencies or by the private sector. In California, that responsibility was created under the California Integrated Waste Management Act of 1989 and Assembly Bill (AB) 939.

3.6.2.2 State

Public Utilities Code Section 1001-1013 and California Public Utilities Commission General Order 131-D

The California Public Utilities Commission (CPUC) regulates public electric utilities in California. Section 1001-1013 of the Public Utilities Code requires that railroad companies operating railroads primarily powered by electric energy or electric companies operating power lines shall not begin construction of electric railroads or power lines without first obtaining a certificate from the CPUC specifying that such construction is required for the public's convenience and necessity. General Order 131-D establishes CPUC rules for implementing Public Utilities Code Section 1001-1013 relating to the planning and construction of electric generation, transmission/power/distribution line facilities, and substations located in California. A permit to construct (PTC) must be obtained from CPUC for facilities between 50 kilovolts (kV) and 200 kV. A certificate of public convenience and necessity (CPCN) must be obtained from the CPUC for facilities 200 kV and above. Both the PTC and CPCN are discretionary decisions by CPUC that are subject to CEQA.

Rules for Overhead 25 kV AC Railroad Electrification Systems

The purpose of these proposed rules is to establish uniform safety requirements governing the design, construction, operation, and maintenance of 25 kV AC (alternating current) railroad electrification overhead contact systems (OCS). When CPUC completes these rulemaking proceedings, there will be a new CPUC General Order that will apply to the HSR project.

The rulemaking is for 25-kV Electrification System, which includes new safety rules only for construction and operation of high-speed train OCS. The traction power system (TPS), which includes all power substations and required interconnections with utilities, will be constructed per existing safety rules (General Orders) and is not part of these proceedings. This rulemaking process is not related to relocation of utilities that enable construction of HSR infrastructure. All this work will be performed based on bilateral agreements with utilities and in accordance with existing regulations and design criteria.

Designation of Transmission Corridor Zones (Cal. Code Regs., tit. 20, §§ 2320–2340)

The regulation on Designation of Transmission Corridor Zones specifies the scope and process required for identification, evaluation, and designation of new transmission corridor zones.

Energy Efficiency Standards (Cal. Code Regs., tit. 24, Part 6)

The regulation on Energy Efficiency Standards promotes efficient energy use in new buildings constructed in California. The standards regulate energy consumed for heating, cooling,

ventilation, water heating, and lighting. The standards are enforced through the local building permit process.

Renewable Portfolio Standard Program (Senate Bill (SB) 1078)

The Renewable Portfolio Standard Program requires retail sellers of electricity to increase their purchases of electricity generated by renewable sources and establishes a goal of having 20 percent of California's electricity generated by renewable sources by 2017. In 2010, the California Air Resources Board (CARB) extended this target for renewable energy resource use to 33 percent of total use by 2020 (CARB 2010). Increasing California's renewable supplies will diminish the state's heavy dependence on natural gas as a fuel for electric power generation.

Integrated Waste Management Act (AB 939)

In response to the Resource Conservation and Recovery Act, the California Integrated Waste Management Act of 1989 was enacted by Assembly Bill (AB) 939. It requires cities and counties to prepare an integrated waste management plan, including a countywide siting element (CSE), for each jurisdiction. Per Public Resources Code Sections 41700-41721.5, the CSE provides an estimate of the total permitted disposal capacity needed for a 15-year period, or whenever additional capacity is necessary. CSEs in California must be updated by each operator and permitted by Department of Resources Recycling, which is within the Natural Resources Agency, every 5 years. AB 939 mandated that local jurisdictions meet solid waste diversion goals of 50 percent by 2000.

Sustainable Communities and Climate Protection Act of 2008 (SB 375, Chapter 728, Statutes of 2008)

Adopted in September 2008, SB 375 provides a new planning process to coordinate community development and land use planning with regional transportation plans (RTP) in an effort to reduce sprawling land use patterns and dependence on private vehicles and thereby reduce vehicle miles travelled (VMT) and greenhouse gas emissions (GHG) associated with VMT. SB 375 is one major tool being used to meet the goals in the Global Warming Solutions Acts (AB 32). Under SB 375, CARB sets GHG emission reduction targets for 2020 and 2035 for the MPOs in the state. Each MPO must then prepare a "sustainable communities strategy" (SCS) that meets the GHG emission reduction targets set by CARB. Once adopted, the SCS will be incorporated into the region's RTP.

Local Government Construction and Demolition Guide (SB 1374)

SB 1374 seeks to assist jurisdictions with diverting construction and demolition (C&D) material, with a primary focus on CalRecycle, by developing and adopting a model C&D diversion ordinance for voluntary use by California jurisdictions.

Protection of Underground Infrastructure (Cal. Gov. Code, § 4216)

This code requires that an excavator must contact a regional notification center (i.e., underground service alert) at least 2 days before excavation of any subsurface installations. The underground service alert will then notify the utilities that may have buried lines within 1,000 feet of the excavation. Representatives of the utilities are required to mark the specific location of their facilities within the work area prior to the start of excavation. The construction contractor is required to probe and expose the underground facilities by hand prior to using power equipment.

Pavley Rule (AB 1493)

In California, the Pavley regulations for automobile efficiency (AB 1493) are expected to reduce GHG emissions from California passenger vehicles by about 22 percent in 2012 and about 30 percent in 2016, all while improving fuel efficiency and reducing motorists' costs.

California Public Utilities Commission General Order 95

The CPUC General Order, Rule for Overhead Electric Line Construction, formulates uniform requirements for overhead electrical line construction, including overhead catenary construction, the application of which will ensure adequate service and safety to persons engaged in the construction, maintenance, operation, or use of overhead electrical lines and to the public in general.

Water Conservation Act of 2009 (SB X7-7)

The Water Conservation Act of 2009 (Senate Bill X7-7, Chapter 4, Statutes of 2009 Seventh Extraordinary Session) requires urban and agricultural water suppliers to increase water use efficiency. The urban water use goal within the state is to achieve a 20-percent reduction in per capita water use by December 31, 2020. Agricultural water suppliers will prepare and adopt agricultural water management plans by December 31, 2012, and update those plans by December 31, 2015, and every 5 years thereafter. Effective 2013, agricultural water suppliers who do not meet the water management planning requirements established by this bill are not eligible for state water grants or loans.

3.6.2.3 Regional and Local

Compile a complete inventory of adopted local and regional plans, ordinances, or guidelines related to public utilities and energy. A tabular format similar to that used in the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014), or more recent HSR project EIR/EIS, should be used to organize and concisely report this information.

Sustainable Communities Strategies

Strategy documents have been prepared by municipalities in response to the California Governor's office of Planning and Research to develop plans to reduce VMT.

County or Municipal General Plans or Community Plans

- General plan public utilities and energy elements and relevant goals, objectives, policies or implementation measures
- Local utility and energy-related ordinances and standards

Urban Water Management Plans

Under California Water Code Section 10610 (et seq.), agencies with public water systems supplying water to over 3,000 customers or supplying more than 3,000 acre-feet of water annually must prepare urban water management plans.

Clean Cities Program

The U.S. Department of Energy's Clean Cities program was established to advance the nation's economic, environmental, and energy security by supporting local actions to reduce petroleum use in transportation.

Countywide Integrated Waste Management Plans (Refer to state regulation Integrated Waste Management Act (AB 939))

These plans include the following components—waste characterization, source reduction, recycling, composting, solid waste facility capacity, education and public information, funding, special waste (e.g., asbestos, sewage sludge), and household hazardous waste.

Elements include:

- Summary plan
- Source reduction and recycling element

- Household hazardous waste element
- Non-disposal facility element
- Countywide siting element

This information will become part of Volume 2 Appendix 3.1-B Regional and Local Policy Inventory.

3.6.3 Regional and Local Policy Analysis

The overall structure of this discussion is presented in Section 3.0.3, Regional and Local Policy Analysis. As described in more detail in subsection 3.0.3.2, this analysis will describe any inconsistency or conflict with adopted regional or local policies and implementation of the HSR project.

3.6.4 Methods for Evaluating Impacts

Evaluation of impacts on public utilities is a requirement of the CEQA Guidelines Appendix G: Environmental Checklist Form, Section XVII, while an assessment of potential energy impacts is a requirement of the CEQA Guidelines Appendix F: Energy Conservation, as well as NEPA. Begin by reviewing and understanding, in order to take account for, all design features in the project description that would reduce or eliminate impacts to utilities. List all existing and proposed utility infrastructure in the corridor, as known, based on information available from local and regional general plans, utility provider information, and field survey information. In addition, describe prior and on-going efforts to avoid impacts to utilities and energy. Describe the methodology for developing the resource study area (RSA) and for evaluating effects under CEQA and NEPA. Subsequent sections in these guidelines provide direction for the design of mitigation measures and the structure for presenting content related to public utilities and energy in the EIR/EIS document.

3.6.4.1 Definition of Resource Study Area

The RSA is the area in which all environmental investigations specific to public utilities and energy are conducted to determine the resource characteristics and potential impacts of the project segment. The factors making up the RSA and the description of the elements comprising the RSA (including an illustrative figure) are provided in Section 3.0.4.1, Definition of Resource Study Area, and Section 3.0.4.2, Methodology for Impact Analysis.

The boundaries of the RSA for public utilities and energy extend beyond the project footprint. This includes utility-owned property that will be used for electrical interconnections and upgrades to connect to HSR. Figure 3.6-1 illustrates the components of an electrical power interconnection, the footprints associated with the elements, and the allocation of resource study areas for HSR or utility investigations. Confer with the Program Management Team (PMT) to confirm the RSA allocation in the HSR section.

The public utilities and energy impact analyses focus on direct and indirect impacts to utility facilities, resources provided by utilities, and energy sources. These impacts can be assessed locally for physical infrastructure conflicts, but the area served by utilities and energy providers needs to be reviewed as part of the RSA to fully understand the existing capacity and reserves of utility resources and energy reserves. Compare these capacities and reserves against the demands of the HSR project to determine impact type and severity.

Indirect impacts related to public utilities and energy may occur beyond the project footprint. For cumulative impacts, the RSA expands to include the geographic extent within which project impacts related to public utilities and energy accumulate or interact with the impacts of other actions, including adjacent HSR project sections.

Table 3.6-1 presents the required information sources and baseline metrics to help define the RSA.

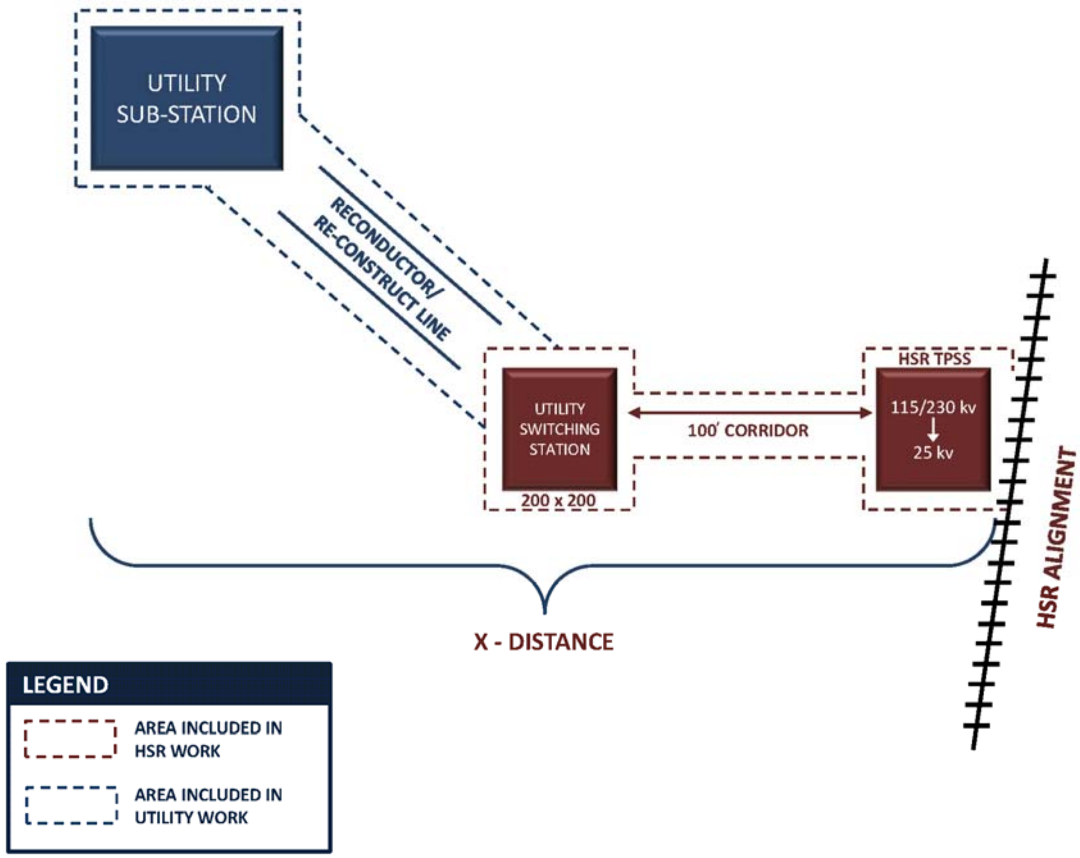


Figure 3.6-1 Electrical Utility Interconnection Footprint

Table 3.6-1 Resource Study Area Information

Required Information	Resource Study Area
▪ Utilities—Project plans/profiles (including existing wet and dry utility plans) ▪ Energy— Conceptual design and project plans and profiles and project description (supply transmission lines, commercial grid connections, substations, switching stations and paralleling stations, and power demands and loads at connection points) ▪ Project right-of-way information ▪ Existing utility easements	▪ Direct impacts—Entire project footprint on or across public utilities and energy infrastructure – Includes surface, subsurface, and overhead utilities, as well as aquifers underlying the construction footprint – If necessary, a broader footprint or a range of footprint options may be considered to ensure all impacts are accounted ▪ Indirect impacts (secondary)—Includes area that would extend beyond the project footprint, such as impacts of utility relocations or use of non-HSR resources and facilities necessary for project construction and operation, and electrical interconnections with local utilities ▪ Existing utility easements ▪ Utility providers for HSR service area (their location, service area, type of service, and infrastructure needs) ▪ Energy— Roadway use same data as developed for the statewide travel demand forecast (see Transportation and Air Quality) ▪ Electricity generation and transmission includes the entire State of California (and western states that produce energy that is exported to California) because the HSR System would obtain electricity from the statewide grid

The RSA for cumulative effects will be a broader area depending on the project section and will consider adjacent HSR project sections to ensure a broad consideration of impacts on a more regional and statewide basis. See Section 3.19, Methodology for Cumulative Impacts, for a more detailed discussion.

3.6.4.2 Methodology for Impact Analysis

Group and consolidate information and discussion in the EIR/EIS to effectively present content to the lay audience (i.e., by distinct resource characteristic or component, such as electricity or water use). Present detailed information on energy impact analysis and utility impact analysis as a result of the proposed HSR alternatives in a technical appendix in Volume 2 of the EIR/EIS. Prepare the following information pertaining to the list of Basin Plan water bodies in Section 3.8.5. This information will be compiled in a Volume 2 technical appendix with all other information from Chapter 3 that is related to impacts upon beneficial uses of Basin Plan waters within the RSA to inform the Clean Water Act Section 401 Certification (33 U.S.C. § 1251 et seq.).

- Environmental Consequences—Assessment of potential impacts upon municipal and domestic use, industrial process and service uses, and power generation that would result from changes in access to or supply of water from affected Basin Plan water bodies; inventory of BMPs or Project Design Features or HSR operations that are part of the project to maintain these beneficial uses; and conclusions for impact significance under CEQA and NEPA
- Mitigation Measures—Indirect impacts upon these beneficial uses that result from implementation of mitigation measures, if any
- Impact Conclusion—Summaries of significant impacts under CEQA and NEPA

Provide specific reference to the technical appendices in the public utilities and energy section of Chapter 3 to help the reader navigate between volumes.

Analyze direct and indirect impacts related to public utilities and energy through quantitative analysis and, where necessary, with qualitative analysis. Analyze impacts which may occur during construction and operation of the HSR system (*Note*: the analytical results for construction impacts and operations impacts will be presented separately in the EIR/EIS). Table 3.6-2 identifies construction and operations impacts associated with Public Utilities and Energy. Apply the same impact thresholds in both project timeframes.

Base the analysis on a review of available reports and data (including federal and state statutes, resource agency, local, and regional agency policies and ordinances), discussions with agency representatives in the region, field investigation, modeling (where applicable), and professional judgment. Develop geographic information system (GIS) databases for each project segment. Develop all GIS data (1) as part of project design or (2) from available federal, state, and local sources. Provide sufficient detail to allow complete analysis of the anticipated design of the completed project or of reasonable assumptions for project implementation, including, but not limited to, structures for grade-separated alignment crossings and water crossings, maintenance road access, all electrical and utility connections or modifications, maintenance and train storage facilities, and stations. Focus analysis on the project’s potential to alter existing conditions of the affected resources in the RSA(s). Identify where permit applications will be needed and provide sufficient detail and analysis to support future permit review. Identify responsible and cooperating agencies for Notice of Intent purposes.

Review the data and impact analyses in the other sections prepared for the EIR/EIS, including Transportation; Electromagnetic Fields and Electromagnetic Interference; Hydrology and Water Resources; Air Quality; Climate Change; Hazardous Materials and Wastes; Station Planning, Land Use, and Development; and Agricultural Lands.

Table 3.6-2 Source and Description of Public Utilities and Energy Impacts

Source of Impacts	Description of Impacts
Construction activities with potential for impacts to public utilities and energy due to temporary or permanent physical change on the landscape by project facilities such as the guideway and supporting structures, HSR-related infrastructure and facilities, stations, parking structures/lots; and non-HSR facilities such as electrical interconnection equipment and facilities	▪ Relocations and reconfigurations of major[1] public utility and energy infrastructure, including provisions for maintenance access, including new roads for maintenance access to canals and substations ▪ Interruption of utility service to safely move or extend lines ▪ Displacement of water wells ▪ Utility conflicts where infrastructure would be upgraded or extended to serve the HSR system ▪ Upgrades or new construction of power lines and other utility facilities such as switching stations or substations necessary to provide electricity for the HSR system ▪ Modified utilities (i.e., encased in a pipe sturdy enough to withstand the weight of HSR system elements and allow maintenance from outside the HSR right-of-way) ▪ Accidental disruption of services ▪ Increased water use; address the sources of water ▪ Increased stormwater generation ▪ Increase in waste generation from vegetation clearing, removal of existing asphalt and gravel, and demolition of existing structures ▪ Hazardous material storage and disposal
Ongoing activities necessary to operate the HSR system and associated facilities	▪ Increased use of resources provided by utilities, including, but not limited to, water, electricity, telecommunications, natural gas, fuel, and petroleum ▪ Increased generation of waste products collected by utilities, including, but not limited to, stormwater, wastewater, and solid waste

Both regional and local governments, as well as utility providers, can supply planned projects and utility data for existing and planned infrastructure projects. Review information on public utilities, HSR electricity demand, and construction energy use contained in the Authority's programmatic environmental documents (Statewide Program EIR/EIS and Bay Area to Central Valley Program EIR/EIS) and any relevant project-level environmental documents.

Utilities

Identify conflicts between HSR alignments or facilities and existing major[1] utilities, including, but not limited to, electricity, natural gas, petroleum and fuel pipelines, telecommunications, potable and irrigable water delivery, stormwater disposal, wastewater disposal, and solid waste disposal. Analyze direct impacts to utility facilities and the impacts from relocation of the facilities, as well as impacts associated with the use of the resource transmitted by the utility facility. The identification process should include the following:

[1] TM 2.7.4 (www.hsr.ca.gov/docs/programs/eir_memos/Proj_Guidelines_TM2_7_4R00.pdf) and TM 2.7.5 (www.hsr.ca.gov/docs/programs/eir_memos/Proj_Guidelines_TM2_7_4R00.pdf) both include the definition of Major Utility.

- Identify major utilities (defined below)
- Identify the utility services (such as water, electricity, or gas) to industrial, commercial, agricultural, and residential customers that may be temporarily shut down to safely move or extend the utility lines
- Identify utilities that would be either relocated outside the restricted access areas of the HSR right-of-way or modified (i.e., encased in a pipe sturdy enough to withstand the weight of HSR system elements and allow maintenance from outside the HSR right-of-way) to avoid conflict with the HSR system
- Identify electric infrastructure conflicts such as those between HSR alignments or facilities and power provider electrical substations and major transmission lines
- Identify the water and electric resources to be used by the HSR project during both construction and operation that will require conveyance by utility infrastructure. Also identify the point of origin for the resource (e.g., reservoir, groundwater, treatment plant, power grid or power plant) and the existing surplus available for use by the HSR project
- Identify the location of facilities and existing capacities for processing and disposing of solid waste, wastewater, and stormwater generated by HSR project construction and operation
- Coordinate with transportation, noise and air quality analysts to identify indirect impacts, including transportation routes, noise and air pollutant emissions from trucks needed to transport any of the solid waste disposal; evaluate and document these indirect impacts in the respective resource/topic chapters
- Identify potential sites for accidental disruption of utility systems, including overhead utility lines (e.g., telephone and cable television) and buried utility lines (e.g., water, wastewater, and natural gas lines)
- Identify potential “utility conflict” areas, such as current utility infrastructure that would be upgraded or extended to serve the HSR system
- Identify the potential effects of anticipated reuse, recycling, and waste diversion to be implemented by the HSR system to reduce solid waste (minimum of 75 percent of construction waste diverted from landfill and 100 percent of steel and concrete demolition waste from landfill)
- Identify the effects on electricity generation and transmission facilities particularly on peak electricity demand periods (4 p.m. to 6 p.m.)

Obtain information about major utility line locations from service providers, field review, project plans and profiles, and as-built drawings. Every effort should be made to obtain available documentation (e.g., as-built drawings) for major utilities. Map existing major utility lines and facilities. California High-Speed Rail Project design criteria define a major utility as any subsurface, above ground, or overhead facility used for transmission, regardless of size, shape, or method of conveyance.[2] In addition, consider electrical substations to be major utilities. Confirm that the project footprint includes areas where major utilities will be relocated and maintenance access will be provided due to the HSR project.[3]

The Authority will consult with the various utility providers during the detailed project-level analysis to minimize potential conflicts. Early consultation and design will be emphasized to reduce the number and likelihood of design refinements after project approval. During final

[2] TM 2.7.4 (www.hsr.ca.gov/docs/programs/eir_memos/Proj_Guidelines_TM2_7_4R00.pdf) and TM 2.7.5 (www.hsr.ca.gov/docs/programs/eir_memos/Proj_Guidelines_TM2_7_4R00.pdf) both include the definition of Major Utility.

[3] Addressed in TM 0.1: www.hsr.ca.gov/docs/programs/eir_memos/TM_0_1_15_Design_Scope_R3_131224_no_sigs.pdf

design, the Authority will consult with each utility provider/owner to avoid or reduce potential impacts on existing and planned utilities through design refinements.

Before any outreach to service providers is performed, the regional team shall present an approach to the Authority and project management team (PMT) for how the team proposes to engage with the service providers to gather the necessary utility baseline data. The regional team should also request any available information the Authority and PMT may already have based on existing agreements between the Authority and utility providers. Based on the current status of discussions and existing level of engagement with utility providers in the study area, the Authority and PMT will provide direction on how best to execute the proposed plan. Once major utilities have been identified and their proposed disposition (relocation or protection) has been designed, include the following in the analysis:

- Provide a detailed map of sufficient scale to illustrate the geographic relationship of each of the alternative alignments to public utilities and energy. The map boundary shall not exceed the extent of a project segment, and must clearly show the location and areal extent of project impacts and major landscape features (e.g., highways, major roads, local jurisdictions, perennial water bodies, or other geographical landmarks or features that convey relative location and size). Obtain Authority, FRA and PMT concurrence on mapping scale before preparing an administrative draft EIR/EIS.
- Evaluate the effects and new location's footprint resulting from the relocation, reconfiguration, and reduced maintenance access of existing utilities in the HSR right-of-way.
- If enough information is not available to evaluate the impacts, complete the analysis based on the best reasonable assumption about what the impacts would be and their location and disclose the assumptions used.
- Determine whether particular conflicts may lead to uncertain outcomes (and explain the reason why) that cannot be determined at this time, which may lead to a secondary impact.
- Evaluate the effects from all necessary upgrades or new construction of power lines and other utility facilities necessary to provide electricity for the HSR system.
- To the extent they are available, utilize existing agreements between the Authority and utility owners to inform assumptions, footprint requirements, analysis, and mitigation necessary for utility conflict resolution.
- Evaluate the electrical demand for the propulsion of the HSR and for the operation of the HSR at terminal stations, storage depots, and maintenance facilities. The PMT, with the RC's support, will provide information regarding energy demand for the HSR system.
- Evaluate the effects from the estimated water use among various alternative alignments and facilities during construction and operation based on the resources identified as available to serve the project. Include an identification of water sources and projected capacity for construction and means for getting water to the construction site, as well as an evaluation of the effects of such water use and conveyance.
- Evaluate the effects from stormwater generation among various alternative alignments and facilities during construction and operation based on the resources identified as available to serve the project. Include an evaluation of facilities to be used for handling stormwater generation both on- and off-site.
- Evaluate the effects from solid waste generation during construction and operation based on the resources identified as available to serve the project. Solid waste generation may derive from clearing of vegetation, removal of existing asphalt and gravel, and demolition of existing structures. Include an evaluation of facilities and projected capacity to be used for handling solid waste generation.

- Evaluate the effects from wastewater generation among various alternative alignments and facilities during construction and operation based on the resources identified as available to serve the project. Include an evaluation of facilities to be used for handling wastewater generation both on- and off-site.

Focus analysis of utilities, while including an assessment of all utility facilities, on the proposed project's potential to result in disruption of services, loss of access to utilities, the need for construction of new or expanded utility services or facilities (including new electrical connections/ facilities, such as traction power supply stations, switching stations, new transmission corridors, and upgrades or reconstruction of existing electrical facilities) or effects to solid waste landfill capacity. Identify which utilities may need to be relocated, how the utilities may be relocated (location, method), and the environmental impacts associated with the relocations. Utility conflicts should be expressed in tabular form as indicated below.

Estimates for water demand, wastewater, stormwater, and waste removal services for HSR stations are based on typical rates, such as gallons per minute, acre-feet per acre per year, or ridership and employment projections. Compare these estimated quantities with anticipated supply and capacity as reported by service providers within the HSR corridor.

Estimate water demand for both construction activities and operation and maintenance at final build-out using the following process:

- Identify facilities that will use water during operations, including stations, maintenance facilities, and track alignments
- Determine appropriate water use factors for each facility on the bases of:
  - Area and volume of buildings and overall site areas
  - Passenger and employee occupancy and duration of use for each station and facility (the PMT, with the RC's support, will provide water use factors)
  - HSR trainset replenishment, where provided by section facilities
  - Facility functions and water requirements for operation and maintenance requirements
- Apply water use factors and estimate new water demand
- Estimate and describe the total change in water use by the HSR section, accounting for the reduction of water use due to the removal of farmland and other existing uses within the project footprint

Water demand estimates for construction are based on an estimated 5-year time period in which earthmoving and construction activities requiring water use would occur. Annual operational water use estimates are based on full build-out of the project in 2040. Generate estimates of existing water use by applying region-specific water use rates for the known land uses in the project footprint.

Estimate wastewater generation for operation and maintenance at final build-out using the following process:

- Identify stations and maintenance facilities that will generate wastewater during operation
- Determine appropriate wastewater generation factors for each facility on the bases of:
  - Area and volume of buildings and overall site areas
  - Passenger and employee occupancy and duration of use for each station and facility
  - Wastewater stream from HSR trainsets that is disposed at appropriate facilities
  - Facility functions and wastewater generated by operation and maintenance

- Apply wastewater generation factors to estimate new wastewater generation by operations and maintenance
- Estimate and describe the total change in wastewater generation for stations and maintenance facilities, accounting for changes in existing wastewater generation due to the removal of existing uses within the project footprint

Solid waste generated by HSR construction and demolition activities is based on estimates by project engineers using the existing character of the study area and the requirements of various project attributes. Operational waste generation is based on the anticipated ridership and number of employees documented in the most-recently adopted Authority Business Plan, taking into account the estimates of waste generation and recycling in California.

Specify permits and approvals required from utility providers and from the CPUC.

Energy

The energy analysis will focus on four areas:

(1) The project's demand on regional energy supply and the potential need for additional electrical generation capacity to support operations (to be conducted by RC)

(2) Peak-period electricity demand or operations (to be conducted by RC)

(3) Overall statewide energy consumption for transportation (to be conducted by PMT)

(4) Construction-related energy consumption (to be conducted by RC)

The PMT, with the regional team's engineering group, will provide design standards and information regarding energy supply and distribution for the HSR system. For the HSR alternatives, peak-period electricity demand will be provided by the section engineering teams as part of the preliminary design for the traction power supply systems. The demand will be calculated in terms of megawatts and compared to current estimates of peak demand and supply capacity within the grid controlled by the California Independent State Operator. In addition to the energy demand of the HSR, the energy impacts in terms of fuel usage resulting from other modes of transportation affected by the project, such as automobiles, planes, and trains, will be calculated in terms of BTUs and barrels of oil. The Authority adopted a policy goal in September 2008 to utilize renewable energy for all traction power. Subsequent planning identified the preferred strategy to realize this goal, which is to procure or produce onsite, where feasible, enough renewable energy to feed into the California grid to offset the energy required for traction power. An industry survey in April 2013 indicated that there is sufficient renewable energy capacity to meet the system demand.

Transportation energy is generally discussed in terms of direct and indirect energy. Direct energy involves all energy consumed by vehicle propulsion (e.g., automobiles and airplanes). This energy is a function of traffic characteristics such as volume, speed, distance traveled, vehicle mix, and thermal value of the fuel being used. This energy also includes the electrical power requirements of the HSR Project, including recoverable energy during HSR train braking. Indirect energy consumption involves the non-recoverable, one-time energy expenditure involved in constructing the physical infrastructure, including construction machinery, material delivery, and worker trips associated with the project, typically through the irreversible burning of hydrocarbons for operating equipment and vehicles in which energy is lost to the environment.

Energy impacts caused by the project might include the additional consumption of electricity required to power the HSR (direct use) and consumption of resources to construct the proposed HSR facilities (indirect use).

The PMT will conduct the statewide transportation energy analysis, in conjunction with the statewide air quality analysis, and will supply the regional team with the results in terms of changes in direct energy from the following elements:

- Roadway vehicles: petroleum consumption rates for vehicle travel will be calculated using CARB's latest emission factor program, currently EMFAC2014. The EMFAC consumption rates, along with regional estimates of vehicle miles traveled (VMT) and associated speeds, will be used to determine the amount of energy used for roadway transportation under the No Project Alternative and HSR alternatives. Results will be provided on a statewide and county level.
- Planes: changes in plane travel will be estimated using total cycle (landing, take-off, and in-flight) emission and fuel use information from the latest version of CARB's California Greenhouse Gas Emission Inventory along with estimated changes in air trips, as calculated by the statewide modeling projections done for the project. Results will be provided on a statewide and, if data is available, regional level.
- HSR: Electrical demands due to the HSR and its associated facilities, based on the latest traction power estimates, will be calculated. Results will be provided on a statewide level.

Indirect energy impacts are to be evaluated quantitatively by the RC. Energy and GHG emissions associated with the manufacturing of the HSR vehicles or with changes in the demand for automobiles, will not be included in this calculation. Construction energy will be determined based on specific schedule and equipment data and will be done in conjunction with the air quality and GHG analysis.

The construction energy payback period is the number of years required to pay back the energy used in construction with operational energy consumption savings of the HSR alternative prorated to statewide energy savings. The RC will calculate the payback period for the HSR section by dividing the estimated HSR system construction energy by the amount of energy that would later be saved by the full operation of the HSR system over the course of a year (based on the prorated statewide value). This would provide the number of years required to pay back the energy used in construction of that HSR section once HSR operations commence. The calculations assume that the amount of energy saved in the study year (2040) would remain constant throughout the payback period.

Baselines for Energy Analysis

The substantial differences in timing and circumstances associated with HSR construction, initiation of HSR operations, interim and full HSR operations requires use of progressive baselines for thorough analysis of potential energy impacts. This approach will capture the changes to energy use from planned traffic improvement projects and the different stages of HSR operation. For example, RTPs include funded transportation projects that are programmed to be constructed by 2040, or subsequent horizon years in later RTPs. These projects are reasonably expected be in place before the HSR project reaches maturity (i.e., the point/year at which HSR-related transportation generation reaches its maximum). An accurate prediction of expected conditions for evaluation of the HSR project's energy impacts must consider these planned improvements in the underlying background conditions to which HSR project effects would be added.

Similar to, and in coordination with, the baseline approach described in Section 3.2.4.2 for the transportation impact analysis, use four potential baselines for assessing project impacts:

1. Environmental Baseline #1: Existing + Construction—Impacts could include any road closures or lane reconfigurations that will be implemented during construction. These could be temporary impacts associated with construction, as well as permanent impacts affecting traffic movement through the altered roadway network.

2. Environmental Baseline #2: Date of Project Implementation—The analysis will consider estimated daily project ridership levels at the date of HSR segment implementation. These estimates will be consistent with information in the most recently adopted HSR Business Plan and will include the years of implementation for the following phases: Initial Operating Segment, Bay to Basin, and Phase 1. The methodology will use the year that trains will begin operation on that segment (according to latest adopted Business Plan; e.g., for the 2014 Business Plan: 2022 for Initial Operating Segment, 2027 for Bay to Basin, 2029 for Phase 1).
3. Environmental Baseline #3: Interim Terminus Stations—This will reflect maximum ridership at a timeframe between the date of implementation and horizon year. A separate analysis of impacts at interim terminus stations shall be included, if applicable, for Authority consideration in consultation with the FRA and station cities. The analysis shall determine the magnitude, severity, and duration of interim impacts, and potential mitigation options.
4. Environmental Baseline #4: Completion of Phase 1 (Horizon year) with full ridership—The timeframe for this baseline is indexed to the RTP(s) applicable to the HSR section (per NEPA practice) and the adopted HSR Business Plan. Current horizon year for HSR is 2040, but the horizon year will advance as RTPs and the HSR Business Plan are updated. The analysis may also consider completion of Phase 2 in future studies, as warranted by Authority business planning and as directed by the Authority.

Structure the impact analysis to allow incremental assessment of impacts related to road closures or lane reconfigurations implemented during construction and HSR station traffic and circulation at initiation of rail service. Prepare a summary matrix that categorizes impacts from all four baseline analyses, primarily by construction impacts and operations impacts, and secondarily by interim impacts and permanent impacts.

Present details in Appendix 3.6-A, Existing plus Project Conditions Energy Analysis. This approach complies with CEQA case law culminating in *Neighbors for Smart Rail v. Exposition Metro Line Construction Authority* (2013, 57 Cal. 4th 439) by providing information on the baselines that are most relevant to the timing of impacts. Court decisions indicate that a projected future baseline is an appropriate means to analyze environmental effects of a long-term infrastructure project, when the reasons for using that future baseline are supported by substantial evidence.

For all impacts, determine significance of impacts under NEPA and CEQA based on the application of the following methods.

3.6.4.3 Method for Determining Significance under NEPA

NEPA does not provide a definitive threshold to determine significant or potentially significant impacts for public utilities and energy, as described in more detail in Section 3.0.4.3, Method for Determining Significance under NEPA. In cases where there are no defined thresholds, professional judgment is used when considering the resource context, the intensity and duration of the potential effect, and implementation of mitigation measures to determine whether an impact is significant or less than significant. All relevant aspects of context (e.g., existing resource conditions, resource sensitivity) and appropriate factors of intensity (e.g., extent of change, duration of change) must be considered for determining impact significance.

3.6.4.4 Method for Determining Significance under CEQA

Utilities and Service Systems

Based on CEQA Guidelines, the project would have a significant impact if it would:

- Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board

- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects
- Need new or expanded entitlements to supply water to the project
- Result in a determination by the wastewater treatment provider that serves or may serve the project that it does not have adequate capacity to serve the project's projected demand in addition to its existing commitments
- Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects
- Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs
- Not comply with federal, state, and local statutes and regulations related to solid waste

Low-impact conflicts would occur if the project would cross or conflict with distribution pipelines or electrical power lines, which are easier to avoid or relocate. Low-impact conflicts are considered less-than-significant impacts on utilities and service systems.

For purposes of analysis for this EIR/EIS, the Authority is using these additional criteria as thresholds of significance. Analyze whether the project would:

- Require or result in the construction of new electrical facilities or expansion and upgrade of existing facilities, the construction of which could cause significant environmental effects
- Conflict with a major non-linear fixed facility, such as an electrical substation or wastewater treatment plant, the relocation of which could cause a lengthy and harmful interruption of service
- Conflict with a major linear non-fixed facility, such as large stormwater transmission main or gas/electricity transmission facility, the reconstruction or relocation of which could cause a lengthy and harmful interruption of service

Energy

According to Appendix F of the CEQA Guidelines, EIRs must discuss the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy. Wise and efficient use of energy may include decreasing overall per-capita energy consumption; decreasing reliance on fossil fuels such as coal, natural gas and oil; and increasing reliance on renewable energy sources. The significance criteria discussed herein are used to determine whether the project would have a potentially significant effect on energy use, including energy conservation.

- Significant long-term operational or direct energy impacts would occur if the project would place a substantial demand on regional energy supply or require substantial additional capacity or substantially increase peak and base period electricity demand.
- By contrast, if the proposed project results in energy savings, alleviates demand on energy resources, or encourages the use of efficient transportation alternatives, it would have a beneficial effect.

3.6.5 Affected Environment

Include a concise summary description of existing major public utility and energy resources along the proposed HSR alignments and at proposed HSR facilities consistent with the direction provided in Section 0, Methodology for Impact Analysis. In particular:

- Identify all major existing and proposed utility infrastructure (both aboveground and underground). A map may be created to illustrate the locations of utility lines and facilities, as well as utility line ownership, alternatives, and proposed mitigation measures.
- Document established local policies concerning content of public utilities and energy-related impacts.
- Describe pertinent stakeholder issues and concerns from public outreach efforts and personal contact with all utility and service district providers if and when such contact is approved by the Authority and PMT.
- Cross-reference all subsections of the EIR/EIS (by lowest numbered heading tier to aid location of the discussion), that describe the resources or are related to the resources (e.g., Station Planning, Land Use and Development, Transportation, and Regional Growth)

The following tables provide key information needed for a complete description of the Affected Environment and typical sources for the information.

3.6.5.1 Public Utilities

Table 3.6-3 Key Information and Sources for Major Electrical Facilities and Transmission or Power Lines

Key Information	Sources of Information
▪ Existing electrical substations and major transmission or power lines (50 kV to 200 kV, 200 kV and above) and electrical utility providers in and adjacent to alignment corridor ▪ Maps of transmission line corridors ▪ Existing utility easements ▪ Planned improvements, upgrades, or other capital improvement projects planned in the resource study area and timing of these projects ▪ Existing facilities that would provide power to the HSR system (consult with project engineers), including electrical power to substations ▪ Existing capacity and existing demand servicing the grid ▪ Existing resources available to serve the HSR project ▪ Locations for electrical grid connections and supply transmission lines, based on information from utilities, if possible ▪ Existing power demands and loads at connection points ▪ Changes in the existing conditions for HSR section area energy resources, electricity demand, electricity generation capacity, electricity transmission capacity, electricity demand and generation capacity outlook, and transportation energy consumption ▪ Existing resources available to serve the HSR project	▪ Utility providers, contact in person (utilize information from existing Authority agreements with utility providers, coordinate with Authority before contacting utility providers directly) ▪ Each section's engineering team (reports and information) ▪ Field review ▪ Document review ▪ Electricity provider will conduct interconnection study to determine where new facilities and improvements are required. Such studies will support environmental review, permitting, and delivery of electricity for HSR. These studies will be coordinated by the Authority and PMT. ▪ CEC ▪ CPUC ▪ California ISO

3.6.5.2 Natural Gas Lines (high pressure)

Table 3.6-4 Key Information and Sources for Major Natural Gas Lines

Key Information	Sources of Information
▪ Major or critical (high pressure) natural gas facilities and major (high pressure) natural gas distribution lines in or adjacent to the HSR right-of-way ▪ Existing resources available to serve the HSR project ▪ Existing easements ▪ Planned improvements, upgrades, or other capital improvement projects planned in the provider's service area that overlap with the resource study area; also identify timing of these projects	▪ Natural gas providers ▪ State Fire Marshall or Office of Emergency Services ▪ Each section's engineering information (conceptual design, project plans and profiles, utility plans and reports, and other relevant information) ▪ Field review ▪ Document review

3.6.5.3 Petroleum and Fuel Pipelines

Table 3.6-5 Key Information and Sources for Major Petroleum and Fuel Pipelines

Key Information	Sources of Information
▪ Petroleum and fuel facilities and major pipelines within 100 feet of the HSR right-of-way ▪ Existing easements ▪ Existing resources available to serve the HSR project ▪ Planned improvements, upgrades, or other capital improvement projects planned in the resource study area and timing of these projects	▪ Petroleum and fuel providers (may be security or proprietary issue) ▪ Each section's engineering information (conceptual design, project plans and profiles, utility plans and reports, and other relevant information) ▪ Field review ▪ Document review ▪ Department of Conservation, Division of Oil, Gas and Geothermal Resources

3.6.5.4 Communications Facilities

Table 3.6-6 Key Information and Sources for Major Communication Facilities

Key Information	Sources of Information
▪ Type of communication facilities (relay stations, antennae farms, etc.) and services (cable, telephone, fiber optic and overhead distribution lines and communication infrastructure (i.e., towers and antennas), etc.) in or adjacent to the HSR right-of-way ▪ Existing easements ▪ Existing resources available to serve the HSR project ▪ Planned improvements, upgrades, or other capital improvement projects in the resource study area and timing of these projects	▪ Communication service providers ▪ Each section's engineering information (conceptual design, project plans and profiles, utility plans and reports, and other relevant information) ▪ Field review ▪ Document review

3.6.5.5 Water Supply Infrastructure and Facilities

Table 3.6-7 Key Information and Sources for Major Water Supply Infrastructure and Facilities

Key Information	Sources of Information
▪ Type of major water supply facilities (treatment, reservoirs, pump plants, major pipelines (transmitting water from one region to another), canals, groundwater/aquifer, and aqueducts (outside diameter of 16 inches or larger)) in or adjacent to the HSR right-of-way, including facilities where relocation would be difficult or infeasible ▪ Current status and capacity of the water system as well as projected future conditions – Coordinate with utility providers as necessary. – Units should be reported in both acre-feet per year and gallons per day. ▪ As applicable, type of farming irrigation water facilities, including aqueducts, channels, groundwater/aquifer, etc., in or adjacent to the HSR right-of-way, including facilities where relocation would be difficult or infeasible ▪ Existing easements ▪ Existing resources available to serve the HSR project ▪ Planned improvements, upgrades, or other capital improvement projects planned in the resource study area and timing of these projects	▪ Local utility providers ▪ Field review ▪ Document review ▪ Each section's engineering information (conceptual design, project plans and profiles, utility plans and reports, and other relevant information) ▪ Water districts, urban water management plans ▪ Water supply companies ▪ Department of Water Resources ▪ Bureau of Reclamation ▪ State Water Resources Control Board ▪ Regional Water Quality Control Boards

3.6.5.6 Waste Water Infrastructure

Table 3.6-8 Key Information and Sources for Major Wastewater Infrastructure

Key Information	Sources of Information
▪ Type of major waste water facilities (treatment plants, major pipelines (trunk lines), sewer drains (outside diameter of 16 inches or larger), and onsite sewage systems (e.g., septic tanks)) in or adjacent to the HSR right-of-way, including facilities where relocation would be difficult or infeasible ▪ Existing easements ▪ Existing resources available to serve the HSR project ▪ Planned improvements, upgrades, or other capital improvement projects planned in the resource study area. Determine timing of these projects	▪ Local utility providers ▪ Each section's engineering information (conceptual design, project plans and profiles, utility plans and reports, and other relevant information) ▪ Field review ▪ Document review ▪ Regional Water Quality Control Board

3.6.5.7 Solid Waste Disposal Facilities

Table 3.6-9 Key Information and Sources for Solid Waste Disposal Facilities

Key Information	Sources of Information
▪ Waste reuse and recycling operations and identify landfills within project section communities ▪ Existing resources available to serve the HSR project ▪ Planned improvements, upgrades, or other capital improvement solid waste facilities projects planned in the resource study area and timing of these projects	▪ Local providers, local and county general plans, and other local agency sources as appropriate ▪ Document review ▪ Integrated Waste Management Board ▪ Department of Conservation

3.6.5.8 Energy

Table 3.6-10 Key Information and Sources for Energy

Key Information	Sources of Information
▪ Energy use of the area by sector ▪ Statewide VMT/VHT estimates, by county ▪ Changes in air passenger trips ▪ Fuel usage of planes ▪ Energy use of the HSR and associated facilities (stations, maintenance facilities, etc.) ▪ Construction schedule and equipment (must be consistent with data provided for air quality analysis)	▪ Department of Conservation Energy profile of study area data from Department of Energy's Energy Information Administration ▪ California Energy Commission ▪ CARB's latest Greenhouse Gas Emission Inventory (currently 2000–2009) ▪ California ISO ▪ Statewide transportation demand modeling results ▪ Operations Analysis ▪ Regional team/PMT construction schedulers

3.6.6 Environmental Consequences

General formatting and terminology for constructing the discussion of environmental consequences is provided in Section 3.0.6, Environmental Consequences. The following direction is specific for the evaluation of Public Utilities and Energy. The heading structure for this organizational scheme is shown in Section 3.6.11.

The analysis should start with a consideration of impact avoidance and minimization features that are incorporated into the project in Section 2.5.2, HSR Build Alternatives, and evaluated in Volume 2, Appendix 2-E. Account for implementation of design features or best management practices, such as compliance with established engineering and technical standards of federal and state agencies and private organizations (ANSI/IEEE) that are intended to avoid the types of impacts being evaluated in this chapter. Refer to the summary table of impact avoidance and minimization features, and explain how particular features avoid impacts or ensure less-than-significant impacts to public utilities and energy. The Authority has also adopted a sustainability policy that includes the project design and construction requirements that avoid and minimize impacts (Authority 2013).

Give each impact a short descriptive title, e.g., *New stormwater drainage facilities or expansion of existing facilities for HSR stations,* as well as a number, such as *PU&E#2*. Explain the results of the analysis prescribed in Section 3.6.4. In particular, describe how the activity or physical change causes an impact upon the resource, reaching specific, separate conclusions about significance for each impact based on the significance criteria and methods defined for NEPA and CEQA in Section 3.6.4. For example:

> *New HSR stations will consist of buildings and paved areas. Stormwater runoff from new impervious surfaces, including station parking areas and access roads, will be managed through design and implementation of low-impact development techniques for on-site capture, detention, and treatment to avoid or minimize off-site discharge. These new facilities will generate __X__ a.f. of run-off. Existing stormwater capacity is available to absorb __X__ a.f. of run-off in the locations where it is needed. These impacts are less than significant under NEPA and under CEQA because the quantity of stormwater release would not require new stormwater infrastructure and would not degrade the quality of off-site receiving waters.*

Simplify impact discussions whenever possible with references or citations to the more detailed information in the appendices. Tables should be used whenever possible to summarize the impacts and simplify the text.

The NEPA and CEQA assessments shall reach specific, separate conclusions about significance for each impact using the significance criteria and methods defined in the NEPA and CEQA subsections of the Methods for Evaluating Impacts subsection.

3.6.7 Mitigation Measures

General formatting and terminology for constructing the discussion of mitigation measures is provided in Section 3.0.7, Mitigation Measures. The following direction is specific for the evaluation of Public Utilities and Energy. Present the mitigation measures associated with the project alternatives within each geographic segment under the subheadings of Construction and Operations. The heading structure for this organizational scheme is shown in Section 3.6.11. Give each mitigation measure a short descriptive title and a number, such as *PU&E-MM#1*, that corresponds to the primary significant impact for which the measure is proposed (if practical).

Develop project-level measures that are consistent with adopted program and project strategies that avoid or minimize impacts. Begin by considering programmatic mitigation strategies described in Section 3.0.7 and the public utilities and energy-related technical reports and environmental document sections in the most recent environmental documents produced by the Authority (e.g., *Fresno to Bakersfield Section Final EIR/EIS*, or more recent HSR project EIR/EIS), as applicable to the HSR project section.

Identify section-specific measures to mitigate any significant impacts, such as reducing peak energy demand, using alternate fuels (particularly renewable ones) or energy systems, and recycling, which could result in energy conservation. Identify specific mitigation measures for each significant environmental impact. Draft the mitigation measures to facilitate transition into the Mitigation Monitoring and Enforcement Plan by clearly identifying responsibility and timing for implementation, as appropriate.

Provide an introductory paragraph for the subsection that concisely describes the mitigation measures for the resource. Refer to the resource-specific Chapter 3 subsection in the *Fresno to Bakersfield Section Final EIR/EIS*, or more recent HSR project EIR/EIS, as an example. Assign a brief descriptive title and a number to each mitigation measure that corresponds to the short descriptive title and number assigned to the primary resource impact(s) to assist tracking. Describe mitigation measures that are specific to the resource subsection and include code and title references to measures specific to other resources that provide mitigation benefits to the

subsection resources. Organize the presentation of mitigation measures by the HSR geographic segment configuration defined in Chapter 2, Alternatives. Present the impacts associated with the project alternatives within each geographic segment under the subheadings of Construction Impacts and Operations Impacts. Organizing impacts by these two general periods of project implementation will help explain when impacts are expected to occur. The heading structure for this organizational scheme is shown in Section 3.6.11.

3.6.8 Impacts from Implementing Mitigation Measures

General guidance for constructing the discussion of impacts from implementing mitigation measures is provided in Section 3.0.8, Impacts from Implementing Mitigation Measures.

Mitigation measures can cause both positive and negative impacts that must be disclosed and considered as part of the environmental analysis. For example, *reconfigure existing substations at their present locations or relocate them to adjacent properties. Substations may be able to be reconfigured on-site to avoid impacts from the HSR project footprint. If that is not possible, they would be relocated to adjacent properties. The potential impacts of each relocation on the existing use at the site of relocation (and proposed mitigation measures, if warranted) are described in Section Section 3.13, Station Planning, Land Use, and Development. Other impacts of substation relocation may include reconfiguring potentially affected electrical lines and related components connected to an electrical substation, brief power service interruptions when disconnecting from existing infrastructure and connecting to replacement electrical service infrastructure.*

Evaluate all mitigation measures, including off-site measures, using the methods in Section 0. Determine probable impacts using actual, on-the-ground analysis and describe the substantial basis for analytical conclusions (including defined thresholds or other criteria). When the impacts of mitigation measures cannot be quantified (e.g., at a specific location, in a definite extent, at a particular time or duration, or measurable alteration of the affected resource), evaluate potential impacts using clearly described assumptions based upon reasonably foreseeable outcomes.

For brevity, the Volume 1 EIR/EIS subsection can provide a summary explanation when the details of analyses and conclusions are documented in a Volume 2 technical appendix (covering all potential impacts from implementing mitigation measures).

3.6.9 Impacts Summary

3.6.9.1 NEPA Impacts

The overall structure and content of this discussion is presented in Section 3.0.9.1, NEPA Impacts. The heading structure for this organizational scheme is shown in Section 3.6.11. Use maps, as appropriate to show locations of significant impacts of alternatives by segment.

3.6.9.2 CEQA Significance Conclusions

The overall structure and content of this discussion is presented in Section 3.0.9.2, CEQA Significance Conclusions. The heading structure for this organizational scheme is shown in Section 3.6.11 of this methodology. Use maps, as appropriate, to show locations of significant unavoidable impacts of alternatives by segment.

3.6.10 Products

The RC is responsible for preparing the following products, under Authority and FRA direction, according to PMT guidance and subject to PMT quality control and assurance.

3.6.10.1 Technical Report or Appendix

In addition to the Volume 1 impacts analysis chapter, provide technical reports and Volume 2 appendices where full analysis applicable to the HSR project section requires details in excess of efficient inclusion in the EIR/EIS Volume 1 chapter. For example:

1. Volume 2, Appendix 2-E, Project Impact Avoidance and Minimization Features Analysis
2. Volume 2, Appendix 3.1-B, Regional and Local Policy Inventory
3. Volume 2, Appendix 3.6-A, Existing Plus Project Conditions Energy Analysis
4. Volume 2, Appendix 3.6-B, Water Usage Analysis Technical Memorandum
5. Volume 2, Appendix 3.6-C, Energy Analysis Memorandum
6. Public Utilities and Energy Technical Report

3.6.10.2 Project EIR/EIS Volume 1

1. Summary/Table for EIR/EIS Executive Summary
2. Project Description—Public Utilities and Energy-related Components
   a. Impact Avoidance and Minimization Features
   b. Summary Table of Impact Avoidance and Minimization Features, and Project Impacts
3. Chapter 3 Affected Environment, Environmental Consequences, and Mitigation Measures Section: 3.6 Public Utilities and Energy
4. Chapter 3 Affected Environment, Environmental Consequences, and Mitigation Measures Section 3.19: Cumulative Impacts upon Public Utilities and Energy

3.6.11 Public Utilities and Energy EIR/EIS Outline

The RC will use the following outline for organizing content related to the *resource* in Chapter 3 of the project EIR/EIS, using the heading hierarchy and format as indicated. The RC will consider the impacts of implementing mitigation measures in Section 3.6.7.

3.6 Public Utilities and Energy
- 3.6.1 Introduction
- 3.6.2 Laws, Regulations, and Orders
  - 3.6.2.1 Federal
  - 3.6.2.2 State
  - 3.6.2.3 Regional and Local
- 3.6.3 Regional and Local Policy Analysis
- 3.6.4 Methods for Evaluating Impacts
  - 3.6.4.1 Definition of Resource Study Area
  - 3.6.4.2 Method for Determining Significance under NEPA
  - 3.6.4.3 Method for Determining Significance under CEQA
- 3.6.5 Affected Environment
  - 3.6.5.1 Project Segment 1
    - Alternative 1
    - Alternative 2
    - Alternative 3
    - Alternative N

3.6.5.2 Project Segment 2
- Alternative 1
- Alternative 2
- Alternative 3
- Alternative N

3.6.5.3 Project Segment 3
- Alternative 1
- Alternative 2
- Alternative 3
- Alternative N

3.6.5.4 Project Segment N
- Alternative 1
- Alternative 2
- Alternative 3
- Alternative N

3.6.6 Environmental Consequences

3.6.6.1 Overview

3.6.6.2 Project Segment 1
- No Project
- Alternative 1
  - Construction Impacts
  - Operations Impacts
- Alternative 2
  - Construction Impacts
  - Operations Impacts
- Alternative 3
  - Construction Impacts
  - Operations Impacts
- Alternative N
  - Construction Impacts
  - Operations Impacts

3.6.6.3 Project Segment 2
- No Project
- Alternative 1
  - Construction Impacts
  - Operations Impacts
- Alternative 2
  - Construction Impacts
  - Operations Impacts
- Alternative 3
  - Construction Impacts
  - Operations Impacts
- Alternative N
  - Construction Impacts
  - Operations Impacts

3.6.6.4 Project Segment 3
- No Project
- Alternative 1
  - Construction Impacts
  - Operations Impacts
- Alternative 2
  - Construction Impacts
  - Operations Impacts

Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.6.6.5 Project Segment N
No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.6.7 Mitigation Measures
3.6.7.1 Project Segment 1
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.6.7.2 Project Segment 2
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.6.7.3 Project Segment 3
Alternative 1
Construction Measures
Operations Measures

Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.6.7.4 Project Segment N
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.6.8 NEPA Impact Summary
3.6.8.1 Alternative 1
Construction Impacts
Operations Impacts
3.6.8.2 Alternative 2
Construction Impacts
Operations Impacts
3.6.8.3 Alternative 3
Construction Impacts
Operations Impacts
3.6.8.4 Alternative N
Construction Impacts
Operations Impacts
3.6.9 CEQA Significance Conclusions
3.6.9.1 Alternative 1
Construction Impacts
Operations Impacts
3.6.9.2 Alternative 2
Construction Impacts
Operations Impacts
3.6.9.3 Alternative 3
Construction Impacts
Operations Impacts
3.6.9.4 Alternative N
Construction Impacts
Operations Impacts

3.7 Biological Resources and Wetlands

The methodology guidelines in this section are organized by a sequence of steps for preparing an environmental document. Section 3.7.11 provides an outline for this environmental impact report/environmental impact statement (EIR/EIS) section.

Section 3.0, General Methodology Guidance for Resource Sections, provides the methodological framework common to the evaluation of all resource areas. Section 3.19, Cumulative Impacts, provides the cumulative impact analysis methodology. Use Section 3.0 and Section 3.19 in combination with this Biological Resources and Wetlands guidance section when developing the EIR/EIS analyses.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the resource section. Example text that illustrates the concepts and methods is shown in *italics*. The methods are organized to mirror the organization of the EIR/EIS section or chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

If there is a discrepancy between the material in this guidance and any adopted federal and state agency guideline or manual applicable to biological resources and wetlands, the agency guideline or manual controls. Identify and discuss any such discrepancy with the California High-Speed Rail Authority (Authority), Federal Railroad Administration (FRA), and the Program Management Team (PMT) before deviating from this guidance.

3.7.1 Introduction

The general method for preparing an introduction for this resource section is provided in Section 3.0.1, Introduction. This direction is particular to Biological Resources and Wetlands. Refer specifically to related content in other sections of the EIR/EIS that influence or are influenced by the Biological Resources and Wetlands impact analysis and supportive/associated technical documents. References to other documents must include citation to specific sections (by lowest heading tier, e.g., 3.X.X), not just a general reference to a chapter in the EIR/EIS.

- Section 3.4, Noise and Vibration, discusses noise and vibration that would occur in the project vicinity from the operation of the project. Potential impacts on wildlife due to project noise and vibration are based on information provided in the *High-Speed Ground Transportation Noise and Vibration Impact Assessment Manual* (FRA 2012).
- Section 3.8, Hydrology and Water Resources, discusses existing surface water hydrology, water quality, groundwater, and floodplains, and identifies potential impacts on these resources for each alternative.
- Section 3.14, Agricultural Lands, discusses the range of impacts on agricultural lands that may overlap with the biological conditions discussed and evaluated in this section and addresses potential impacts on pollinating bees.
- Section 3.18, Regional Growth, includes a discussion of growth-inducing impacts.
- Section 3.19, Cumulative Impacts, describes the cumulative impacts of this and other past, present, and reasonably foreseeable future projects.

3.7.1.1 Key Definitions

Key definitions of special-status species, special-status plant communities, and jurisdictional waters are provided below. Each of these resources is further defined in the *[section name]Section: Biological Resources and Wetlands Technical Report* (Authority and FRA [publication year]).

- Special-Status Species—Special-status species are plants and animals that are legally protected under the federal Endangered Species Act of 1973 (FESA, (16 U.S.C. § 1531 et seq.)), the California Endangered Species Act (CESA, California Fish and Game Code (CFGC), §§ 2050–2085), the California Native Plant Protection Act (CFGC, §§ 1900–1913), the California Fully Protected Species statutes, and other regulations, such as those species that meet the definitions of rare, threatened, or endangered under California Environmental Quality Act (CEQA) Guidelines Sections 15380 and 15125. The special-status species designation does not extend to bird species protected under the Migratory Bird Treaty Act (16 U.S.C. § 703–712) or the corresponding California bird protection statutes (CFGC §§ 3503, 3513); however, impacts to these species are discussed under special-status wildlife species sections of this document. Further detail can be found in the [section name]Section: Biological Resources and Wetlands Technical Report (Authority and FRA [publication year]).
- Habitats of Concern—Habitats of concern consist of special-status plant communities, riparian areas, jurisdictional waters, critical habitat, conservation areas (i.e., recovery plan areas for federally listed species, conservation easements, public lands, conservation banks, and Habitat Conservation Plans (HCP)), protected trees, and wildlife movement corridors).
  - Special-Status Plant Communities—Special-status plant communities are determined to be significant or to represent rare vegetation types (California Natural Diversity Database (CNDDB) (CDFW [publication year])) or to have limited distribution statewide or within a county or region and include riparian areas that are jurisdictional to the California Department of Fish and Wildlife (CDFW) under CFGC 1600 et seq. These communities are often vulnerable to the environmental effects of projects (CDFW 2000). A list of special-status plant communities in California is maintained by CDFW in the Vegetation Classification and Mapping Program—Natural Communities List (CDFW 2010a). Additional information can be found in the [HSR Project Section]: Biological Resources and Wetlands Technical Report (Authority and FRA [publication year]).
  - Riparian Areas—Riparian areas are regulated under CFGC (CFGC § 1600 et seq., Streambed Alteration Agreement). A riparian area consists of the transitional habitat between terrestrial and aquatic ecosystems. For analysis purposes in this section of the EIR/EIS, riparian areas are the vegetated areas between a seasonal riverine feature and the outer drip line of the adjacent vegetation. Riparian vegetation supports a unique set of physical and biological processes, including temperature regulation and wildlife habitat, and provides valuable aquatic food web services (inputs for nutrient cycling and food availability) to adjacent aquatic ecosystems.
- Jurisdictional Waters—Wetlands and other waters in the project vicinity, including waters of the U.S., waters of the state, and state streambeds and lakes, are regulated by the federal government (U.S. Army Corps of Engineers (USACE)) and the State of California (State Water Resources Control Board (SWRCB) and CDFW). Wetlands and other waters are collectively termed jurisdictional waters. Wetlands and other waters as delineated during the jurisdictional delineation (see the *[HSR Project Section]: Preliminary Jurisdictional Waters and Wetlands Delineation Report* (Authority and FRA [publication year]) are assumed to fall under the jurisdiction of the USACE, SWRCB, and CDFW for purposes of this discussion. Confirmation of these waters as jurisdictional by the USACE, SWRCB, and CDFW will be obtained through the regulatory permitting process. Definitions of the categories that are included in the jurisdictional waters sections are presented below.
- Waters of the U.S.—The federal Clean Water Act (CWA, 33 U.S.C. § 1251 et seq.) defines waters of the U.S. as follows: (1) all waters that are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of the tide; (2) all interstate waters, including interstate wetlands; (3) all other waters, such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes,

or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce; (4) all impoundments of waters otherwise defined as waters of the U.S.; (5) tributaries to the foregoing types of waters; and (6) wetlands adjacent to the foregoing waters (33 C.F.R. § 328.3(a)). Wetlands are a sub-classification of waters of the U.S., as described below. The term other waters of the U.S. is used to describe waters of the U.S. exclusive of wetlands.

- Wetlands—According to the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0) (USACE 2008b), three criteria must be satisfied to classify an area as a wetland: (1) a predominance of plant life that is adapted to life in wet conditions (hydrophytic vegetation); (2) soils that saturate, flood, or pond long enough during the growing season to develop anaerobic conditions in the upper part (hydric soils); and (3) permanent or periodic inundation or soils saturation, at least seasonally (wetland hydrology).
- Waters of the State—Waters of the state are broadly defined by the Porter-Cologne Water Quality Control Act (Cal. Water Code § 13050(e)) to mean any surface water or groundwater, including saline waters within the boundaries of the state. Under this definition, isolated wetlands that may not be subject to regulations under federal law are considered waters of the state and regulated accordingly.
  - On January 28, 2013, the California Water Boards released a revised preliminary draft of the Wetland Area Protection Policy, which includes a proposed wetland definition. Under this definition, an area is a wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area either lacks vegetation or the vegetation is dominated by hydrophytes (SWRCB 2013). Because this definition is still in draft form, the term wetland as used in this document refers to the USACE definition of wetlands, given above. Within this document, all waters of the state, except riparian areas, are classified as wetlands or other waters of the U.S. Although this policy is not yet final, the analyst should take this draft policy into consideration when developing their strategy.
  - State Lakes and Streambeds—The CDFW has not released an official definition of lake or streambed jurisdiction and therefore the extent of areas regulated under (CFGC § 1600 et seq.) remains undefined. However, CDFW jurisdiction generally includes the streambed and bank, together with the adjacent floodplain and riparian vegetation. This riparian area is classified as waters of the state in this document.
- Critical Habitat—Critical habitat includes areas identified under Section 7 of the Endangered Species Act (15 U.S.C. § 1531–1544, FESA Section 3(5)(A)). Designated critical habitats are described in 50 C.F.R. Parts 17 and 226. Specifically, critical habitat includes areas for federally listed special-status species consisting of the specific areas within the geographic area occupied by the species, at the time it is listed in accordance with the provisions of Section 4 of the FESA, on which are found those physical or biological features (constituent elements) that are essential to the conservation of the species and that may require special management consideration or protection; and specific areas outside of the geographical area occupied by the species at the time it is listed in accordance with the provisions of Section 7 of the FESA, on a determination by the Secretary of the Department of Interior that such areas are essential for the conservation of the species.
- Conservation Areas—Conservation areas include areas that have been identified as part of HCPs, Natural Community Conservation Plans (NCCP), or other approved local, regional, state, or federal HCPs. Conservation areas also include recovery plan areas for federally listed

special-status species, public lands (refuges and ecological reserves), and conservation and mitigation banks).

- Recovery Plan Areas—Section 4(f) of the FESA directs the Secretary of the Interior and the Secretary of Commerce to develop and implement recovery plans to promote the conservation of endangered or threatened species. The U.S Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) are responsible for administering the FESA. In some instances, recovery plans identify specific areas and describe what research and management actions are necessary to support recovery but do not themselves commit manpower or funds. Recovery plans are used in setting funding priorities and provide direction to local, regional, and state planning efforts.
- Conservation Easements—A conservation easement is a binding, legal agreement between a landowner and a land trust or government agency that limits uses of the land to protect its conservation values and achieve specific conservation objectives. A conservation easement allows landowners to continue to own and use their land. However, certain actions are prohibited, and the landowner agrees to conserve or restore habitat, open space, scenic, or other ecological resource values on the land covered by the easement.
- Public Lands—Public lands are owned and typically maintained by the government, including cities, counties, states, and the federal government.
- Conservation Banks—Conservation banks are permanently protected lands that contain natural resource values. These lands are conserved and permanently managed for special-status species, jurisdictional waters, or other natural resources. Conservation banks function to offset adverse impacts on natural resources that occurred elsewhere; for this reason, these banks are sometimes referred to as offsite mitigation. In exchange for permanently protecting the land and managing it for natural resources, the natural resource regulatory agencies (e.g., USFWS, USACE, or CDFW) approve a specified number of natural resource (habitat, species, or resource) credits that bank owners may sell.
- Habitat Conservation Plans—HCPs are planning documents required as part of an application for an Incidental Take Permit under Section 10 of the FESA. As defined in this document, HCPs also include NCCPs, which identify measures necessary to conserve and manage natural biological diversity within the planning area while allowing compatible and appropriate economic development, growth, and other human uses. Each HCP describes the anticipated effects of the proposed taking, how those impacts will be minimized or mitigated, and how the HCP is to be funded.

- Protected Trees—Protected trees are trees or tree communities that have special significance and are afforded protection by, and specifically identified in, county and city ordinances, codes, or general plans. Cities and counties traversed by the proposed project alternatives include [HSR Project Section]. The types of trees and specific physical characteristics required to meet the local definitions vary by city and county.
- Wildlife Movement Corridors—Wildlife movement corridors are areas defined by wildlife use for movement events on varying scales (e.g., daily foraging, seasonal migration, or dispersal). The wildlife movement corridors referenced in this document refer to areas that have been modeled for specific species based on different physical and biological parameters published in statewide reports. For purposes of this document, the term habitat linkage is used synonymously with wildlife movement corridor. Habitat linkages are areas of land used for a variety of purposes that potentially serve as a corridor for movement or migration of wildlife. Habitat linkages aid in the dispersal and distribution of wildlife and are crucial for maintaining healthy populations of multiple species.

3.7.2 Laws, Regulations, and Orders

Federal, state, and local laws, regulations, orders, or plans relevant to biological resources and wetlands in the geographic area that is affected by the project are presented below. General NEPA and CEQA requirements for assessment and disclosure of environmental impacts are described in Section 3.1, Introduction, and therefore not restated in this resource section.

3.7.2.1 Federal

Procedures for Considering Environmental Impacts (64 Fed. Reg. § 28545)

These Federal Railroad Administration (FRA) procedures state that an EIS should consider possible impacts on ecological systems, wetland areas, and endangered species or wildlife.

Endangered Species Act of 1973 (16 U.S.C. § 1531 et seq.)

The FESA and subsequent amendments provide guidance for conserving federally listed species and the ecosystems upon which they depend. The applicable sections of the FESA are further discussed below.

- Section 7 requires federal agencies to consult with USFWS or NMFS, as appropriate, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered fish, wildlife, or plant species or result in the destruction or adverse modification of designated critical habitat for any such species. As part of the consultation, USFWS and NMFS will issue a biological opinion and an incidental take statement for wildlife species to exempt the Section 9 take prohibition.
- Section 9 and its implementing regulations prohibit the "take" of any fish or wildlife species listed under the FESA as endangered or threatened, unless otherwise authorized by federal regulations. The term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Take includes the modification of a listed species' habitat. Section 9, prohibits a number of specified activities with respect to endangered and threatened plants as well as adverse modifications to critical habitat.
- Section 10 provides a process by which nonfederal entities may obtain an Incidental Take Permit from USFWS or NMFS for otherwise lawful activities that might incidentally result in "take" of endangered or threatened species, subject to specific conditions. The project is a federal agency project and therefore will not utilize Section 10; however, the project may impact areas covered by Section 10 Habitat Conservation Plans.

Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 et seq.)

The amended Magnuson-Stevens Fishery Conservation and Management Act, also known as the Sustainable Fisheries Act (Public Law 104-297), requires that all federal agencies consult with NMFS on activities or proposed activities authorized, funded, or undertaken by that agency that may adversely affect essential fish habitat of commercially managed marine and anadromous fish species.

Clean Water Act (33 U.S.C. § 1251 et seq.)

The federal CWA serves as the primary federal law protecting the quality of the nation's surface waters, including wetlands. The applicable sections of the CWA are further discussed below.

- Under Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the U.S. must obtain certification from the state in which the discharge would originate or from the interstate water pollution control agency with jurisdiction over affected waters. Project sponsors must obtain a 401 Water Quality Certification from SWRCB.

- Under Section 402, all point source discharges, including, but not limited to, construction-related stormwater discharges to surface waters, are regulated through the National Pollutant Discharge Elimination System (NPDES) program. Project sponsors must obtain an NPDES permit from SWRCB.
- Under CWA Section 404, USACE and the U.S. Environmental Protection Agency (EPA) regulate the discharge of dredged and fill materials into the waters of the U.S. Project sponsors must obtain a permit from USACE for discharges of dredged or fill materials into proposed jurisdictional waters over which USACE determines that it will exert jurisdiction.

Rivers and Harbors Act of 1899 (33 U.S.C. § 401 et seq.)/General Bridge Act of 1946 (33 U.S.C. § 525 et seq.)

The Rivers and Harbors Act is a primary federal law regulating activities that may affect navigation on the nation's waterways, including:

- Section 9 of the Rivers and Harbors Act and Section 9 of the General Bridge Act require a permit for the construction of bridges and causeways over certain navigable waters of the U.S. to ensure marine traffic is not adversely affected. Navigable waters are defined as those water bodies subject to the ebb and flow of the tide and that are utilized currently, potentially, or historically in their natural condition or by reasonable improvements, as means to transport interstate or foreign commerce. Section 9 bridge permits are only required for waters that are currently or potentially navigable for commerce; general recreational boating is typically not sufficient to establish jurisdiction. Section 9 bridge permits are issued by the U.S. Coast Guard.
- Section 10 of the Rivers and Harbors Act requires authorization from the USACE for the construction of any structure in or over any navigable waters of the U.S.
- Section 14 of the Rivers and Harbors Act requires permission for the use, including modifications or alterations, of any flood control facility work built by the U.S. to ensure that the usefulness of the federal facility is not impaired. The permission for occupation or use is to be granted by "appropriate real estate instrument in accordance with existing real estate regulations." For USACE facilities, the Section 408 approval, known as Section 408 permit, is required.

U.S. Fish and Wildlife Coordination Act (16 U.S.C. § 661–666c)

The U.S. Fish and Wildlife Coordination Act applies to any federal project where any body of water is impounded, diverted, deepened, or otherwise modified. Project proponents are required to consult with USFWS and the appropriate state wildlife agency.

Migratory Bird Treaty Act (16 U.S.C. § 703–712)

The Migratory Bird Treaty Act (MBTA) of 1918 prohibits the take of the nest, eggs, birds, or any parts thereof (listed at 50 C.F.R. Part 10.13 as modified by 75 Fed. Reg. § 9281).

Migratory Bird Treaty Reform Act (16 U.S.C. § 703 et seq.; PL 108–447)

The Migratory Bird Treaty Reform Act amends the MBTA of 1918 to exclude nonnative birds or birds that have been introduced by humans to the U.S. or its territories from protection under the Act. The statute defines a native migratory bird as a species present in the U.S. and its territories as a result of natural biological or ecological processes.

Bald and Golden Eagle Protection Act (16 U.S.C. § 668–668(d); 50 C.F.R. Part 22)

The Bald and Golden Eagle Protection Act (BGEPA) prohibits anyone from taking, possessing, or transporting bald eagle (*Haliaeetus leucocephalus*) or golden eagle (*Aquila chrysaetos*), or the parts, nests, or eggs of such birds without prior authorization. The BGEPA regulations authorize issuance of incidental take permits of bald and golden eagles under limited circumstances.

Protection of Wetlands (USEO 11990)

U.S. Presidential Executive Order (USEO) 11990 aims to avoid direct or indirect impacts to wetlands from Federal or federally approved projects when a practicable alternative is available. If wetland impacts cannot be avoided, all practicable measures to minimize harm must be included.

Protection of Migratory Bird Populations (USEO 13186)

USEO 13186 directs each federal agency taking actions that have or may have adverse impact on migratory bird populations to work with USFWS to develop a memorandum of understanding that will promote the conservation of migratory bird populations.

Invasive Species (USEO 13112)

USEO 13112 requires federal agencies to work cooperatively to prevent and control the introduction and spread of invasive plants and animals.

Wilderness Act (16 U.S.C. §§ 1131–1136) (as applicable to a given section)

The Wilderness Act preserves and protects wilderness areas in their natural condition for use and enjoyment by present and future generations. This law applies to all lands designated by Congress as part of the wilderness system and provides criteria for determining suitability and establishes restrictions on activities that can be undertaken in a designated area.

Coastal Zone Management Act (16 U.S.C. §§ 1451–1464; 15 C.F.R. Parts 923, 930) (as applicable to a given section)

The Coastal Zone Management Act applies to all projects significantly affecting areas under the control of the State Coastal Zone Management Agency. Before federal approval is granted, a consistency determination with the approved Coastal Zone Management Plan from the State would be required.

Wild and Scenic Rivers Act (16 U.S.C. §§ 1271–1287) (as applicable to a given section)

This Act preserves certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations.

3.7.2.2 State

California Endangered Species Act (Cal. Fish and Game Code, §§ 2050–2085)

The California Endangered Species Act (CESA) prohibits the take of any fish, wildlife, or plant species listed as endangered or threatened, or designated as candidates for listing, under CESA. Take refers to mortality or injury of the listed species itself and not the modification of a listed species habitat. Compared to the FESA process, CESA contains a procedure for CDFW to issue a Section 2081 incidental take permit authorizing the take of listed and candidate species incidental to an otherwise lawful activity, subject to specified conditions, including that the impacts of the take are fully mitigated.

California Fish and Game Code

Sections 3511, 4700, 5050, and 5515 (Fully Protected Species)

The California Fish and Game Code (CFGC) designates 37 fully protected species and prohibits the take or possession at any time of such species with certain limited exceptions.

Sections 3503, 3503.5, and 3513 (Bird Protections)

Section CFGC 3503 states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by code or any regulation made pursuant thereto. Section 3503.5 prohibits the take, possession, or needless destruction of any nests, eggs, or birds

in the orders Falconiformes (New World vultures, hawks, eagles, ospreys, and falcons, among others) or Strigiformes (owls). Section 3513 prohibits the take or possession of any migratory nongame bird or part thereof, as designated in the MBTA. To avoid violation of the take provisions, it is generally required that project-related disturbance at active nesting territories be reduced or eliminated during the nesting cycle.

Section 1600 et seq. (Lake and Streambed Alteration)

Section 1600 et seq. requires notifying the CDFW prior to any project activity that might (1) substantially divert or obstruct the natural flow of any river, stream or lake; (2) substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake; or (3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake.

If after this notification CDFW determines that the activity may substantially adversely affect fish and wildlife resources, a Lake or Streambed Alteration Agreement will need to be obtained.

Natural Communities Conservation Planning Act (Cal. Fish and Game Code, §§ 2800–2835)

The Natural Communities Conservation Planning Act was enacted to encourage broad-based planning to provide for effective protection and conservation of the state's wildlife resources while continuing to allow appropriate development and growth. NCCPs may be implemented, which identifies measures necessary to conserve and manage natural biological diversity within the planning area, while allowing compatible and appropriate economic development, growth, and other human uses. The project may impact lands covered by NCCPs.

California Native Plant Protection Act (Cal. Fish and Game Code, §§ 1900–1913)

The California Native Plant Protection Act (NPPA) requires all state agencies to use their authority to carry out programs to conserve endangered and rare native plants. The NPPA gives the CDFW the power to designate native plants as "endangered" or "rare" and prohibits the take of such plants, with certain exceptions.

Porter-Cologne Water Quality Control Act (Cal. Water Code § 13000 et seq.)

The Porter-Cologne Water Quality Control Act provides for implementation of the federal CWA by SWRCB, including issuance of Section 401 Certifications and Section 402 NPDES Permits. Issuance of a Section 401 Certification requires documenting compliance with state water quality standards, including watershed plans, designated beneficial uses, and the total maximum daily load (TMDL) program.

The Act regulates discharges that could affect the quality of waters of the state and requires a waste discharge requirements (WDR) form be obtained for discharges, including fill of wetlands that are not otherwise authorized by Section 404 or Section 402 of the federal CWA. Application for WDRs requires filing of a report of waste discharge.

The regional consultant (RC) should coordinate with the Program Management Team (PMT) regarding the need for obtaining WDRs and the latest regarding the pending SWRCB wetland policy.

California Coastal Act (Cal. Public Resources Code, §§ 30000–39000) (as applicable for a given section)

The California Coastal Act defines coastal zone and establishes land development controls for the zone, including requirements for a coastal development permit.

California Coastal Commission implementing regulations (Cal. Code Regs., tit. 14, Div. 5.5) (as applicable for a given section)

The regulations define the permitting process, including restrictions, appeals, and enforcement, as well as permits issued by local governments and public agencies.

3.7.2.3 Regional and Local

Compile a complete inventory of adopted local and regional plans, ordinances, or guidelines related to biological resources. Use a tabular format similar to that used in the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014), to organize and concisely report this information. This information will become part of Volume 2 Appendix 3.1-B Regional and Local Policy Inventory.

- County or municipal general plans or specific plans—Land use, biology, vegetation, open space, and other relevant elements
- Noise ordinances and codes related to species and their habitats
- Tree preservation ordinances
- McAteer Petris Act (applicable to areas within Bay Conservation and Development Commission jurisdiction)
- Local coastal programs (as applicable to a given section)
- Habitat conservation plans
- Natural community conservation plans

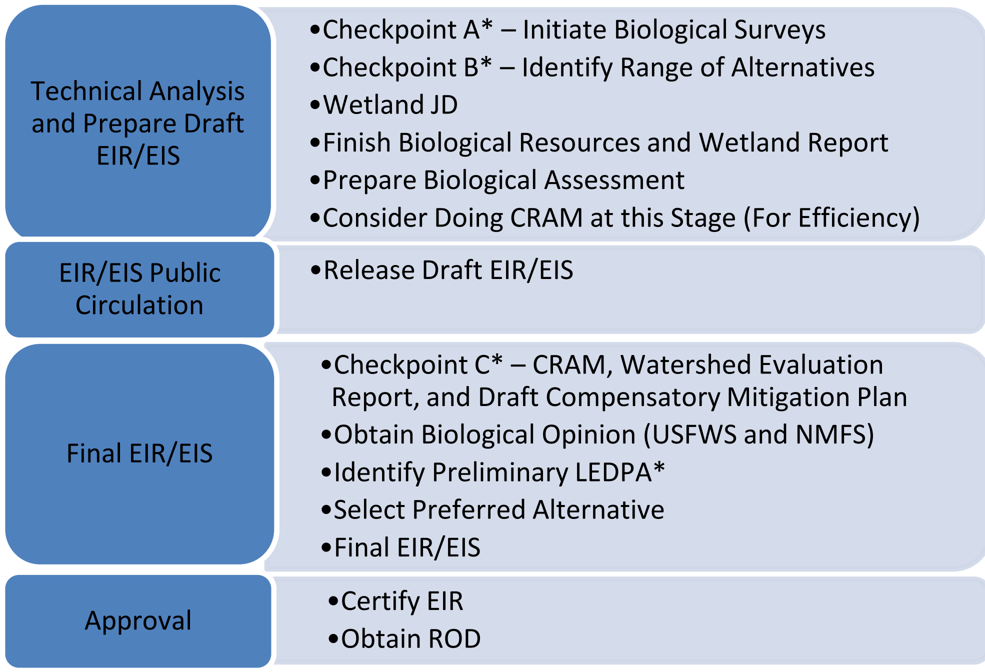
3.7.3 Regional and Local Policy Analysis

The overall structure of this discussion is presented in Section 3.0.3, Regional and Local Policy Analysis. As described in more detail in subsection 3.0.3.2, this analysis will describe any inconsistency or conflict with adopted regional or local policies and implementation of the HSR project.

3.7.4 Methods for Evaluating Impacts

Evaluation of impacts on biological resources and wetlands is a requirement of several federal, state, regional, and local regulations and laws (see Section 3.7.2), NEPA, CEQA, and the NEPA/404/408 Integration MOU between the FRA, Authority, USACE, and USEPA.[1] List all the biological resources and wetlands in the corridor as known based on information available from the biological reference documents identified throughout this methodology. Describe prior and on-going efforts to avoid impacts to biological resources, including reference to impact avoidance and minimization features described in Section 2.5.2, HSR Build Alternatives. This section describes the methodology for developing the resource study area (RSA) and for evaluating effects under CEQA and NEPA. Subsequent sections in this methodology provide direction for the design of mitigation measures and the structure for presenting content related to biological resources and wetlands in the EIR/EIS documents. Coordinate the collection of information, analysis of impacts, and design of mitigation measures for EIR/EIS documents with the requirements of the NEPA/404/408 Integration MOU. Figure 3.7-1 shows the general sequence of the biological resources/environmental document deliverables/milestones for the CEQA/NEPA and NEPA/404/408 Integration processes through the approval of the EIR/EIS environmental document. Per the checkpoint process, complete the California Rapid Assessment Methodology (CRAM) analysis must be completed between the draft EIR/EIS and final EIR/EIS; however, the process likely can be started before this time (pending constraints such as site access, etc.)

[1] Available on the Authority Internet web site, at www.hsr.ca.gov/docs/programs/eir_memos/Proj_Guidelines_NEPA404_408MOU.pdf



Note: * Refer to Section 404/408 Checkpoint Process

Figure 3.7-1 General Timeline of Biological Resources/Environmental Activities

3.7.4.1 Definition of Resource Study Area

The RSA is the study area for environmental investigations specific to biological resources and wetlands, which is analyzed to determine potential impacts to biological resources within the project segment. The factors making up the RSA and the description of the elements comprising the RSA are provided in Section 3.0.4.1, Definition of Resource Study Area, and Section 3.0.4.2, Methodology for Impact Analysis.

For direct impacts on biological resources and wetlands, the study area is the project footprint. Indirect (secondary) impacts on biological resources and wetlands may occur beyond the project footprint. The study areas for indirect impacts differ based on resource type and include the following distances from the edge of the project footprint (agency agreement on the buffers distances was based on agency standards and best available scientific methodologies):

- 100-foot buffer for plant species (special-status plant study area)
- 250-foot buffer for wetland habitats, and the entire vernal pool if a portion is directly impacted (wetland study area)
- 1,000-foot buffer for wildlife species (habitat study area)

Table 3.7-1 identifies the information and extent of the resource study area for direct and indirect impacts.

Table 3.7-1 Resource Study Area Information

Required Information	Resource Study Area
▪ Aerial maps ▪ Geographic Information System (GIS) base ▪ Project description—HSR system, linear and sited facilities, stations, ancillary improvements and operations and maintenance activities. See *Operations and Service Plan* in EIR/EIS Volume II appendixes for additional details on operation and maintenance activities. ▪ Project plans and profiles, other design materials in sufficient detail to complete environmental impact assessment of all proposed improvements and operations within the affected geographic area (project footprint) – Design elements include the HSR project and related facilities, temporary access and construction/staging areas, utility improvements and connections, etc. ▪ Station locations and footprints in sufficient detail to complete environmental impact assessment of all construction and operations, regardless of implementation or operating entity ▪ Construction phases and interim build conditions/transitions for all project and ancillary improvements, and stations ▪ Right-of-way data showing parcel acquisitions ▪ Local and regional land use plans and other relevant land use documents ▪ Regional planning documents identifying conservation lands (habitat conservation plans, etc.) ▪ Biological resource conservation easements	▪ Direct impacts—Entire project footprint on or across biological resources and wetlands (for direct impacts), with the exception of vernal pools and swales (where if a portion of the pool or swale is impacted, then the whole vernal pool or swale is considered directly impacted ▪ Indirect impacts—Includes area that would extend beyond the project footprint up to 1,000 feet beyond track centerline, depending on the type of biological resources or wetlands that may be affected by HSR construction and operation ▪ Other sections of the EIR/EIS as appropriate for impacts related to or influencing biological resources and wetlands, such as water quality and noise. ▪ Areas needed for in situ or off-site mitigation measures (also within the project footprint) ▪ Identify and analyze the secondary impacts of mitigation implementation (also within the RSA).

The RSA for cumulative effects will be a broader area depending on the project section and will consider adjacent HSR project sections to ensure a broad consideration of impacts on a more regional and statewide basis. See Section 3.19, Methodology for Cumulative Impacts, for a more detailed discussion.

3.7.4.2 Biological Resource Study Area

The following text provides more detail for the extent of the RSA for biological resources and wetlands (including habitat and corridors). In general, the biological RSA encompasses the entire potential area of disturbance associated with the project footprint, including the proposed HSR right-of-way and associated facilities (traction power substations, switching and paralleling stations, and areas associated with modifying or relocating roadways for those facilities—including overcrossings and interchanges), maintenance facility sites, station alternatives, construction areas (including laydown, storage, and similar areas), areas needed for in situ and offsite mitigation measures and areas outside of the project footprint with potential indirect

effects. RSA boundaries for the particular biological resources that could be evaluated in the EIR/EIS include the following:

- Habitat Study Area—Project footprint plus a 1,000-foot buffer around project elements to evaluate direct and indirect impacts on habitats and the special-status wildlife species that use them. The habitat study area consists of two subareas—a core habitat study area and an auxiliary habitat study area. A third, or supplemental, habitat study area can be identified for specific species, as required by regulatory agencies or standard protocols:
  - The core habitat study area includes the proposed project footprint and a 250-foot buffer.
  - The auxiliary habitat study area extends an additional 750 feet outward from the edge of the core habitat study area, for a total of 1,000 feet. Analysis within the auxiliary habitat area can be done by extrapolating observations made in the core habitat study area through aerial photograph interpretation or windshield surveys.
  - The supplemental habitat study area extends up to 10 miles outward from the project footprint, depending on the target species. Identify species-specific habitats based on aerial photograph interpretation and documented occurrences of the species, and on observations of special-status species and their habitats made in the field.
- Wetland Study Area—Project footprint plus a 250-foot buffer to evaluate direct and indirect impacts on wetlands and special-status wildlife inhabiting vernal pools and swales. Direct impacts on wetlands occur within the project footprint and indirect impacts occur within the 250-foot buffer. Figure 3.7-2 illustrates the boundaries of the wetland study area.
  - If a portion of a vernal pool or swale is within the project footprint and therefore directly impacted, then the whole vernal pool or swale will be considered directly impacted for purposes of impact and mitigation methodology. In the Fresno-Bakersfield section documents, the term "indirect, bisected" was coined to describe that portion of a directly impacted vernal pool that occurs outside of the project footprint. This term should be used in future documents for consistency.

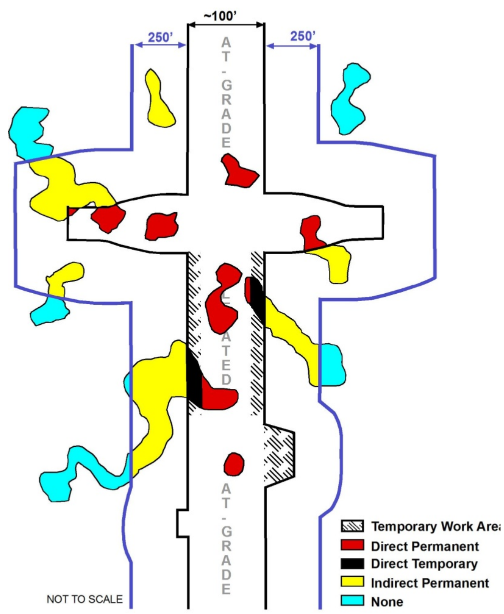


Figure 3.7-2 Wetland Study Area (example only)

- Special-Status Plant Study Area—Project footprint to evaluate direct impacts plus a 100-foot buffer to evaluate indirect impacts on sensitive plant resources (including special-status plants, special-status plant communities, protected trees, and elderberry shrubs).
- Wildlife Movement Study Area—Project footprint plus a larger area based on the species likely to be present and determined based on agency regulations and guidance, literature, and best professional judgment and in consultation with appropriate regulatory agencies.

The biological resources and wetland impact analysis focuses particularly on properties where the alignment disrupts biological resources that are dependent upon habitat linkages or movement across the alignment or where there may not be sufficient remnant property after conversion of areas to HSR uses to support biological resources. Consider more distant biological resource and

wetland effects where necessary, such as where the distances between HSR road crossings would influence biological resources, such as wildlife crossings. Since biological resource areas may vary from HSR section to section, work with the PMT and resource agencies to identify and document appropriate buffer areas for habitat, wetlands, and special-status plant species evaluation.

3.7.4.3 Pre-Field Investigation and Consultation with Resource Agencies

Pre-field investigations generally consist of reviewing the existing background information to prepare for the field surveys, including developing survey plans for special status species, wetlands, and other waters of the U.S., and initial consultations with resource specialists. Biologists will review existing resource information related to the project region and consult with Resource Specialists (USFWS, NMFS, CDFW, Bureau of Land Management (BLM), U.S. Forest Service (USFS), USACE, SWRCB, Regional Water Quality Control Board (RWQCB), and other agencies as appropriate as well as species experts) to evaluate whether special-status species or their habitats, sensitive natural communities, and wetlands and other waters of the U.S. and waters of the State could occur or are known to occur in the region. Pertinent sources to review include the following:

- *Final Statewide Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Proposed California High-Speed Train System* (California High-Speed Rail Authority and Federal Railroad Administration November 2005)
- *Final Bay Area to Central Valley HST EIR/EIS* (California High-Speed Rail Authority and Federal Railroad Administration 2008) and the most recent environmental documents produced by the Authority (e.g., *Fresno to Bakersfield Section Final EIR/EIS, (April 2014), or more recent HSR project EIR/EIS*)
- California Natural Diversity Database (CNDDB) records search for the associated quads, including surrounding quads and the CNDDB Quickviewer (California Natural Diversity Database) and RareFind program
- California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California (online at CNPS web site)
- California Rare Plant Ranks (formerly known as CNPS Lists) (www.cnps.org/cnps/rareplants/ranking.php)
- California Wildlife Habitat Relationship (CWHR) System (CDFG 2008)
- USFWS Recovery Plans, Federal Register publications, public agency technical reports, survey guidelines, and other published reports relevant to the HSR section geography
- USFWS species list for applicable counties
- USFWS Birds of Conservation Concern (BCC) for Region 8 (California and Nevada) (USFWS 2008)
- Applicable city and county general plans
- Soil Survey for appropriate area, California (Huntington 1971)
- Relevant CEQA/NEPA documents
- Natural community conservation plans
- Habitat conservation plans (HCP)
- The most current pertinent scientific literature available for special-status species that may be present in the RSA

Wetlands and Other Waters

For pre-field investigations, determine the watersheds associated with the project using the Natural Resources Conservation Service basins data sets (U.S. Department of Agriculture and Natural Resources Conservation Service) and other sources as appropriate. To determine the location, type and potential extent of the known and potentially present jurisdictional waters, review existing data from USFWS, U.S. Geological Survey (USGS), CDFW, and other sources as appropriate. The USACE Regulatory Guidance Letter (RGL 08-02) dated June 26, 2008, provides additional information regarding jurisdictional determinations (JD). Specifically, the document identifies and distinguishes between preliminary JD and approved JD. The preliminary JD (PJD) is a streamlined process, where the project proponent assumes USACE jurisdiction. This determination can be changed to an approved JD (AJD) later on in the process, if warranted. In an AJD, USACE determines the exact jurisdiction and provides an official written representation of the JD findings. The AJD is good for 5 years and requires a substantial amount of information for each impacted feature. The AJD is subject to concurrence by USACE Headquarters in Washington, DC. Coordinate with the PMT and Authority to determine the appropriate JD process approach. The general assumption is that PJDs will be used unless there is a compelling reason to use the AJD process. Where the RC determines the AJD process is warranted and advantageous, the RC shall gain Authority approval of the recommended approach before advancing that course of action.

Determine the RSA area(s) appropriate for each regional section using the RSA criteria from Section 3.7.4.2 (for example, project alignments plus 250-foot buffer on either side of the alignments). Confer with the PMT where there may be an outstanding reason to deviate from the criteria and obtain PMT approval of alternative criteria. Verify the RSA areas encompass wetlands, other waters, and vernal pool complexes that may be present next to the alignments and the general nature of the habitat surrounding the alignments. As appropriate, use a geographic information system (GIS) compilation of data layers from relevant sources, including the National Wetlands Inventory (USFWS), National Hydrology Dataset (USGS, USEPA), Vernal Pool Habitat datasets (CDFW), and other sources.

For pre-field investigations, also consider and initially determine the potential for the Lake and Streambed Alteration (LSA) Agreement requirement through initial informal consultations with CDFW in appropriate CDFW regions. Use maps and aerial images to identify locations where the project can be reasonably assumed to require the LSA Agreement. Present this information to the CDFW during early consultations to facilitate the agreement process to the extent possible.

Preliminary Habitat Assessment

Conduct a preliminary habitat assessment to determine the potential presence of special-status species. The habitat study area will be developed from consideration of the documented habitats in the region and reported occupied habitats. The preliminary habitat assessment will encompass the proposed project footprint (e.g., stations, track, maintenance and equipment storage areas, access roads, temporary construction easements) plus a species-specific boundary for indirect impacts, per RSA definitions.

Include consideration of habitat connectivity, i.e., potentially important landscape linkages and wildlife corridors that could support and facilitate the movement and dispersal of substantial numbers of species between blocks of open space essential for long-term wildlife viability.

Vegetation Mapping

Include preliminary vegetation mapping in the assessment, which will be confirmed/revised after field work is completed. Vegetation mapping describes and maps the vegetation communities in the biological RSA. Derive vegetation classifications of the plant communities from the current version of the *List of Terrestrial Natural Communities of California* prepared by CDFW. In unusual circumstances, when necessary to clarify project impacts, other classifications determined to be

acceptable to CDFW and USFWS may be used in conjunction with the above recommended classification system after coordination with PMT.

For the vegetation mapping, identify, evaluate, and map in GIS all vegetation communities, including potentially important landscape linkages and wildlife corridors that could support and facilitate the movement and dispersal of substantial numbers of species between blocks of open space essential for long-term plant viability.

Include in the detail and scale of habitat mapping consideration of input received from CDFW and other resource agencies, as appropriate.

Sensitive Natural Communities, Critical Habitats, and Special-Status Plants and Wildlife

Develop a list of sensitive natural communities and all federally designated critical habitats and a list of all special-status wildlife and special-status plants that have some potential to occur in the project area using existing databases and resource agency information. Sensitive natural communities include jurisdictional wetlands, waters of the U.S., areas that include sensitive plant species, habitats such as those listed as sensitive by CDFW, and habitats listed as sensitive (including Environmentally Sensitive Habitat Area) by local, regional, and state agencies or planning documents.

Special-status species are plants and animals that are protected under the FESA, CESA, or other regulations, as well as species considered sufficiently rare by the scientific community to qualify for such listing. Table 3.7-2 is a partial list of special-status species types and the sources of information regarding each of these species. Investigate other species types and sources as relevant to the HSR section geography and affected environment.

Include all reported occurrences and those potentially found within appropriate USGS quads in database queries. Determine an appropriate overall investigation area (a standard approach is for a 10-mile radius for database queries and a 9-quad search area, but may vary), based on regional and area-specific characteristics of each regional section.

A preliminary review of important wildlife movement corridors will be conducted using the available information, such as the Missing Linkages reports (e.g., reports by Penrod et al.), habitat and linkage corridor data made available by Endangered Species Recovery Programs, information provided by resources agencies, and other available sources.

Use this information to develop lists of special-status species and other sensitive biological resources that could be present in the RSAs for each resource (biological, wetlands, and wildlife movement RSAs), which are discussed in Section 3.7.4.1. Include species in these lists if they were known to occur in the project region and if their habitats could be located in the RSAs. Conduct early informal consultations with USFWS and CDFW in appropriate CDFW regions for initial guidance and to obtain relevant datasets, which may not be otherwise available without directly contacting the appropriate agency office.

Prepare tables listing special-status plant and wildlife species that have been identified as having the potential to occur in the project RSAs.

Table 3.7-2 Special Status Species

Special-Status Species	Sources of Information
Species listed or proposed for listing as threatened or endangered under the FESA	▪ Listed plants (50 C.F.R. Part 17.12) ▪ Listed animals (50 C.F.R. Part 17.11) ▪ Listed fish (50 C.F.R. Part 223) ▪ Proposed species (various notices in the Federal Register (Fed. Reg.FR)) ▪ Proposed and designated critical habitat and essential fish habitat
Species that are candidates for possible future listing as threatened or endangered under the FESA	69 Fed. Reg. 24876 (May 4, 2004)
Species listed or proposed for listing by the State of California as threatened or endangered under CESA	Cal. Code Regs., title 14, section 670.5
Species that meet the definitions of candidate, rare, or endangered under CEQA	CEQA Guidelines Section 15380
Plants listed as rare under the California Native Plant Protection Act (NPPA)	California Fish and Game Code Section 1900 et seq.
Plants considered by CNPS to be "rare, threatened, or endangered in California"	▪ California Rare Plant Rank 1B (formerly List 1B) ▪ California Rare Plant Rank 2 (formerly List 2)
Plants listed by CNPS as plants about which more information is needed to determine their status, and plants of limited distribution, which may be included as special-status species on the basis of local significance or recent biological information	▪ California Rare Plant Rank 3 (formerly List 3) ▪ California Rare Plant Rank 4 (formerly List 4)
Animal species of special concern to the CDFW	▪ Birds (Remsen 1978, Shuford and Gardall 2008) ▪ Mammals (Williams 1986) ▪ Amphibians and Reptiles (Jennings and Hayes 1994)
California Fully Protected Species	▪ Birds (CFGC § 3511) ▪ Mammals (CFGC § 4700) ▪ Amphibians and Reptiles (CFGC § 5050) ▪ Fish (CFGC § 5515)

3.7.4.4 Field Surveys

Biological Surveys

The purpose of the biological field surveys is to characterize biological communities and their associated wildlife habitat uses, determine whether the biological RSA contains suitable habitat for common and special-status wildlife and plant species, and identify areas that may qualify as potential waters of the U.S. and delineate potential waters of the U.S. to determine the extent of USACE jurisdiction. As appropriate, develop a survey plan, which includes surveys for early-and late-blooming special-status plants, and present for review by CDFW, USFWS, USACE, and other agencies prior to conducting the surveys.

One constraint in conducting biological field surveys relates to limited access to the properties. For these circumstances, windshield surveys should be done to the extent possible and

information should be compared with desktop mapping software. Rain data can also be used to help extrapolate information.

In general, the *Biological Resources and Wetlands Technical Report* should detail the results of the biological surveys to support project-level analysis, including:

- Description of the team that conducted the surveys, consisting of a wildlife biologist and a botanist and wetlands ecologist, as necessary
- Exact dates and times the surveys were conducted and length of times spent performing the surveys
- Weather conditions
- Description of whether the survey was conducted by driving or walking
- Description of the area that was surveyed, including habitat types and vegetation communities
- Species observed
- Photographs taken during the survey
- Record of any deviations from the methods outlined in the survey plan or this document, as appropriate

Special-Status Wildlife and Plant Species Protocol/Focused Surveys

Potential for special-status species, and the level of effort to comply with the FESA and CESA, will ultimately be predicated on the presence or absence of potentially suitable habitat within and adjacent to the biological, wildlife movement, and wetlands RSA. In the case that proposed, threatened, or endangered species are present or habitat is present in the biological or wildlife movement RSAs, FRA (with the Authority's and regional team's input) will initiate consultation with USFWS under Section 7 of the FESA and will prepare a biological assessment (BA) to support a biological opinion.

If determined to be necessary through early consultations with appropriate resource agencies, experts and previous preliminary biological work, the RC will conduct protocol-level field surveys for special-status species pursuant to USFWS, USFS, CDFW, and other appropriate regulatory agency approved methodologies. For permitting purposes, it may be necessary to assume presence of special-status species in identified areas with suitable habitat that are inaccessible (or permit to enter has not been obtained), as well as areas that cannot be effectively surveyed due to other factors, such as time of year or amount of rainfall.

- Conduct protocol-level surveys for special-status plants according to the guidelines established by CDFW or USFWS. The guidelines require that surveys be conducted at the appropriate time of year by qualified individuals and require that all species encountered be identified to the lowest taxonomic level possible.
- Conduct protocol-level surveys for special-status wildlife species according to the guidelines established by CDFW or USFWS. These guidelines are often specific to individual species and often require that the surveyors possess or obtain the necessary permits to conduct the surveys.

The technical report that is prepared will describe the results of special-status species surveys conducted and will evaluate if special aquatic resources or habitat for proposed, state, or federally listed species is present or absent within the biological RSA or wildlife movement RSA. In general, include the following:

- Names of field investigator(s)
- Exact dates and times the surveys were conducted and length of times spent performing the surveys
- Weather conditions
- Species observed
- Description of the area that was surveyed, including habitat types and vegetation communities
- Map and location data for any special-status species observations (including GPS coordinates)
- Representative photos (if possible) and disturbance regime/land use within the RSA(s)
- Complete *CDFW California Natural Diversity Database* forms for each special-status species found
- Record of any deviations from the methods outlined in the survey plan or this document

If necessary, use this information to support preparation of the BA to initiate formal consultation with NMFS and USFWS and a 2081 permit application/consistency determination request to CDFW. Identify the action area (the action area can be different from the biological RSA and wildlife movement RSA), describe the project effects on listed species, and identify measures to avoid, minimize, and compensate for those effects. Prepare the BA to be suitable for submittal to the USFS, NMFS, and USFWS and for inclusion in a technical appendix in the EIR/EIS.

Waters of the U.S., Including Wetlands

Prepare a *Wetlands Delineation Report* to meet the requirements of the CWA and CFGC Section 1600 et seq. jurisdictional delineation. The report will be suitable for submittal to USACE, SWRCB, RWQCB, and CDFW for purposes of CWA Section 401, Section 402, Section 404, and Streambed Alteration Agreement applications and inclusion in the EIR/EIS document. Accordingly, quantify jurisdictional areas and include a breakdown of wetlands, non-wetland waters of the U.S., waters of the state, and other special aquatic resources within the RSA(s).

Include the following in the *Wetland Delineation Report:*

- Description of study methodologies
- Background information on the CWA (e.g., USACE, SWRCB, RWQCB) and CDFW permitting
- A description of vegetation, soils, and hydrology in the project region pursuant to the USACE *Wetland Delineation Manual* (Environmental Laboratory, 1987) and the guidance detailed in *A Field Guide to Lake and Streambed Alteration Agreements Sections 1600-1607* (Environmental Services Division, January 1994)
- Map depicting the field survey results
- USACE field data sheets from sampling locations

California Rapid Assessment Methodology Analysis Report

Apply a rapid functional/conditional assessment methodology or tool that provides information on the general extent and distribution of aquatic resources and the general condition and overall health of the aquatic resources. Base a preliminary landscape-level assessment of functions and services on the best available science, acceptable data sources (e.g., recent wet season aerial photography), and best professional judgment. The assessment may also characterize land uses and habitat connectivity. Use a referenced-based approach to assess functions and services based on existing or already collected field data from nearby, similarly situated wetlands/aquatic resources.

3.7.4.5 Biological Topics to Evaluate

Group and consolidate information and discussion in the EIR/EIS to effectively present content to the lay audience (i.e., by distinct resource characteristic or component, such as habitat, species, or wildlife movement within project segments defined in Chapter 2, Alternatives). Prepare the following information pertaining to the list of Basin Plan water bodies in Section 3.8.5. This information will be compiled in a Volume 2 technical appendix with all other information from Chapter 3 that is related to impacts upon beneficial uses of Basin Plan waters within the RSA to inform the CWA Section 401 Certification.

- Environmental Consequences—Assessment of potential impacts upon freshwater habitat, estuarine habitat, wildlife habitat, especially significant habitats, special-status species, migration, spawning and rearing that would result from changes in the quality or supply of water in or from affected Basin Plan water bodies; inventory of BMPs or Project Design Features or HSR operations that are part of the project to maintain these beneficial uses; and conclusions for impact significance under CEQA and NEPA
- Mitigation Measures—Pertaining to impacts upon these beneficial uses, if any
- Impact Conclusions—Summaries of significant impacts under CEQA and NEPA

Present detailed information on changes to biological resources and wetlands as a result of the proposed HSR alternatives in the EIR/EIS Volume 2 appendix associated with this resource, with specific reference to the appendix provided in the Chapter 3 topical subsection to help the reader navigate between volumes.

Analyze direct and indirect impacts related to biological resources and wetlands through quantitative analysis and, where necessary, with qualitative analysis. Analyze impacts which may occur during construction and operation of the HSR system (*Note*: the analytical results for construction impacts and operations impacts are presented separately in the EIR/EIS.) Table 3.7-3 identifies topics and issues to be evaluated in the biological resources EIR/EIS section.

Begin the presentation of Environmental Consequences with a summary description of present biological resources and wetlands. Describe the buildout of adopted plans within the No Project Alternative, focusing on the changes to the biological resources. Describe direct and indirect impact changes to biological resources and wetlands by type and acreage, and provide a comparison of impacts across alternatives.

Include GIS databases electronic information from federal, state, regional, and local government sources. Generalize resources to consistently present the information among the project segments, to the extent possible.

Evaluate the compatibility of the HSR alternatives on the basis of (1) the potential sensitivity to overlay existing cover types, species habitat, or wetlands/water features to the changes that likely would result from project implementation; (2) the potential impact of these changes on the type, intensity, and pattern of existing biological resources; and (3) the consistency of these changes with expected seasonal and temporal variability. GIS tools and aerial photographs can facilitate the assessment of compatibility and help identify and locate sensitive biological resources (e.g., sensitive species and critical habitat). Use quantitative analysis and GIS tools to determine direct impacts related to implementation and operation of the HSR project and the property acquisitions required for the project.

Table 3.7-3 Biological Topics and Issues to Evaluate

Topic	Issues to Evaluate
Disturbance or loss of special-status wildlife species or their habitat	▪ Species and habitat affected. ▪ Type of impact, including loss of habitat, effects on breeding, movement, seasonality. ▪ Direct or indirect impact. ▪ Construction (temporary or permanent) or operations (interim, intermittent or permanent) impacts. ▪ Can impact be avoided through the use of timing constraints ▪ Will impacts result in fragmentation or isolation of important wildlife habitats or the disruption of movement corridors? ▪ Will this conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? ▪ Is this a substantial adverse effect, either directly or through habitat modification, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by CDFW or USFWS? ▪ Will it interfere substantially with the movement of any native resident or migratory fish or wildlife species, or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? ▪ Will it conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state conservation plan?
Protected wetlands as defined by CWA Section 404 (marsh, vernal pool, and coastal wetlands)	▪ Type and amount of habitat and potential impacts by direct removal, filling, hydrological interruption, or other means. ▪ Will impacts result in fragmentation or isolation of important wildlife habitats or the disruption of movement corridors? ▪ Will there be a substantial adverse effect on federally protected wetlands, as defined by CWA Section 404, through direct removal, filling, hydrological interruption, or other means?
Loss of habitat (e.g., oak woodlands, riparian)	▪ Type and amount of habitat and any local or regional plans, policies or regulations. Indirect or direct effects? Permanent or temporary? Does it result in fragmentation or isolation of important wildlife habitats or the disruption of movement corridors? ▪ Will it conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? ▪ Will it conflict with the provisions of an adopted habitat conservation plan (HCP), natural communities conservation plan (NCCP), or other approved local, regional, or state habitat conservation plan?
Noxious/invasive species	▪ Short-term and long-term impacts associated with the presence (and potential for spread) of noxious/invasive species. ▪ Measures to be taken to minimize the potential for spread of noxious/invasive species.

Direct impacts occur if a project-related change within the project footprint, either along the alignment or at a mitigation site, alters, disrupts, or removes existing biological resources or wetlands/water features. Indirect impacts occur where biological resources or wetlands/water features adjacent to the project footprint or mitigation site would change as a result of the project, particularly during operation. Secondary impacts occur when implementation of a mitigation measure alters, disrupts, or removes existing biological resources or wetlands/water

features. Indirect or secondary effects are caused by the project and are later in time or farther removed in distance, but are still reasonably foreseeable. (14 Cal. Code Regs., § 15358)

Planning for mitigation sites will be conducted by the Authority, PMT, and RC planning and design staff in accordance with Authority guidance and in a collaborative process. Analyze and document the information developed through the design and local collaboration processes for potential environmental impacts and documented. In order to achieve the above goals, mitigation planning should involve collaboration to help identify pertinent issues.

Section 404/408 Checkpoint Process

To comply with the CWA, the Authority and FRA entered into a NEPA/Section 404/Section 408[2] Integration Memorandum of Understanding (MOU) with USEPA and USACE. The MOU requires the agencies to work together to streamline the Section 404/Section 408 process and identify a Preliminary Least Environmentally Damaging Practicable Alternative (LEDPA) needed by USACE for issuing a Section 404 permit prior to project construction. To identify the LEDPA, the Authority and FRA must obtain concurrence from USEPA and USACE at three "checkpoints" during preparation of an EIR/EIS. The three checkpoint processes are integrated with the NEPA process and the information prepared for each of the checkpoints needs to be referenced in the NEPA document. The following describes the approach for these checkpoints.

Checkpoint A—Defining the Purpose and Need

Prepare the purpose and need statement broad enough to allow for consideration of a range of reasonable and practicable alternatives that are commensurate with the level of environmental impacts, but specific enough that the range of alternatives may be appropriately focused in light of the Tier 1 EIR/EIS programmatic decisions.

Checkpoint B—Identifying the Range of Alternatives to be studied in the project EIR/EIS

Follow the Checkpoint B template[3] and include relevant background information. Confer with the PMT to ensure use of the most current version of Checkpoint B guidance.

The sections include introduction, background, and 404(b)(1) preliminary alternatives analysis.

- Use standardized alternatives evaluation criteria for each HSR project EIR/EIS process in order to consider a reasonable range of alternatives and to identify those alternatives that satisfy the project purpose and need, and overall project purpose that are feasible and practicable, and avoid or minimize environmental impacts.
- Apply evaluation criteria to include:
  - A detailed project description of the alternatives with engineering layouts on aerials and cross sections.
  - A brief discussion of the reasons for considering but eliminating alternatives from further detailed study. An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purpose(s).
  - Maps that show the occurrences of all associated sensitive species that have been identified within the survey area in relation to project features (e.g., federally listed endangered species, biological resources, and wildlife crossings).

[2] Section 408 pertains to the evaluation of project-related impacts on flood control facilities and other public works authorized by the federal government. Compliance with the regulatory requirements is described in other guidance issued by the Authority.

[3] Consult with PMT on latest version of this guidance

Checkpoint C—Identifying a Preliminary LEDPA, preparing a USACE Section 408 Draft Response, and preparing a Draft Compensatory Mitigation Plan.

Follow the Checkpoint C template[4] and include relevant background information. Confer with the PMT to ensure use of the most current version of Checkpoint C guidance. The sections include authority, proposed project, scope of analysis, public involvement, alternatives considered, environmental setting, consequences and mitigation, indirect effects, cumulative effects, compliance with federal, state and local laws, and public interest review.

Development of Preliminary Least Environmentally Damaging Practical Alternative

- Describe activities that create:
  - Temporary impacts due to grading, clearing, grubbing, and water diversion activities; location of construction staging areas, access areas, and borrow and storage sites; and the duration of these activities
  - Permanent impacts due the location, size, and depth of structures or fill material; quantity and composition of fill material; and changes in topography and vegetation
  - Operational or long-term activities
- Provide a detailed description and quantification (in estimates acres of impacts) of the project temporary, permanent, indirect, and cumulative impacts on special aquatic sites and other waters of the U.S. These effects must be evaluated at the appropriate local or regional context.
- Provide a detailed (rapid assessment or better) assessment of the functions and services of special aquatic sites and other waters of the U.S. necessary to provide adequate analysis of impacts. Determine which functions are performed by the wetland/waters, the services of those functions, and how the project will affect the continued performance of the identified functions.
- Consider the temporary, permanent, indirect, and cumulative impacts on biological resources.
- Consider the temporary, permanent, indirect, and cumulative impacts on cultural resources, including those listed on the National Register of Historic Places or National Historic Landmarks.

Development of Draft Compensatory Mitigation Plan

Prepare a compensatory mitigation plan to offset permanent losses of waters of the U.S. for purposes of compliance with the Checkpoint process. Later revisions of the compensatory mitigation plan will address other regulatory processes (e.g., 1602, 2081, Biological Opinion, etc.). The plan needs to:

- Be based on the watershed approach and comply with the final mitigation rule issued by USEPA and USACE on April 10, 2008, and USACE-issued *Habitat Mitigation and Monitoring Guidelines*
- Describe any compensatory mitigation based on amount, type, and location of the compensatory mitigation, including any out-of-kind compensation, or indicate the intention to use an approved mitigation bank or in-lieu fee program
- Describe, if proposed, activities to create, restore, or enhance waters of the U.S. and aquatic ecosystems

[4] Consult with PMT on latest version of this guidance

3.7.4.6 Methodology for Impact Analysis

The fundamental method for evaluating biological impacts includes a process for (1) quantifying or describing qualitatively the direct and indirect impacts of the project, and (2) determining whether the impacts are significant for purposes of NEPA and CEQA. Impacts should be assessed for temporary (i.e., construction period) impacts or permanent (i.e., project placement or operational) impacts.

Begin analysis of impacts with consideration of impact avoidance and minimization features that are incorporated into the project in Section 2.5.2, HSR Build Alternatives, and evaluated in Volume 2, Appendix 2-E. Account for implementation of design features or best management practices. Refer to the summary table of impact avoidance and minimization features, and explain how particular features avoid impacts or ensure less-than-significant impacts to biological resources and wetlands.

Prepare detailed maps of sufficient scale to illustrate the geographic relationship of the alternatives to affected resources. The map boundary shall not exceed the extent of a project segment and must clearly show the location and areal extent of project impacts and major landscape features (e.g., highways, major roads, local jurisdictions, perennial water bodies, or other geographical landmarks or features that convey relative location and size). Obtain Authority, FRA, and PMT concurrence on mapping scale before preparing an administrative draft EIR/EIS. Use GIS applications to develop plant community and cover-type mapping units that can then be overlaid on construction footprint maps and RSA boundary delineators.

Use a similar GIS-related process for evaluating impacts on special-status species, although these impacts are based on the potential for occurrence in suitable habitat. For wildlife movement, assess existing and accessible drainage corridor crossings (i.e., bridges and culverts) with respect to their relative function to facilitate wildlife movement through the landscape. In this manner, the information presented can be quantified as appropriate and a comparative evaluation can be made. Provide qualitative discussions for indirect impacts, such as noise, motion, and startle, and any potential hydrologic issues, such as erosion and sedimentation. For these indirect impacts on species' habitat, evaluate the severity without having specific numeric or quantitative data.

Through coordination with USACE and USEPA, the following approach has been developed to evaluate impacts on jurisdictional waters. Quantify impacts to jurisdictional waters through a detailed evaluation of the project activities and elements (e.g., stations, HSR tracks, temporary construction areas) and the associated jurisdictional water type (e.g., canal/ditch, seasonal wetland). For the majority of jurisdictional waters, quantify direct impacts in the manner described above by overlaying the mapped features on the construction footprint. For elevated structures/bridges, show permanent impact for the footing footprints and temporary impact for the outline of the structure per current guidance from USACE for the 404 permit. Because vernal pools and swales are difficult to restore to pre-project conditions following temporary impacts, all impacts on these features are considered permanent.

For all jurisdictional water features, quantify indirect impacts by calculating the acreage of the features that fall within 250 feet of the project footprint (including construction and operation disturbance areas). Provide the acreage calculations for indirect impacts for both construction and operation periods.

For vernal pools and swales, quantify an additional category of impact—indirect bisected—and characterize as a permanent loss of the habitat. Indirect bisected impact represents the entire remainder of any vernal pool feature that is impacted or bisected by the boundary of the project footprint (i.e., where a vernal pool or swale straddles the project footprint boundary). This impact is unique to vernal pools due to the sensitive nature of the hydrology and biological community. For vernal pools and swales, the detailed approach to calculating impacts consists of: (1) areas inside the project footprint are directly impacted; (2) for each vernal pools and swale that has a portion directly impacted, the entire remainder (even extending beyond the wetland study area)

of that feature is indirectly bisected; (3) any portion of a pool that that does not have an impact under (1) or (2) and is within the 250-foot wetland study is indirectly impacted.

3.7.4.7 Method for Determining Significance under NEPA

NEPA does not provide a definitive threshold to determine significant or potentially significant biological impacts as described in more detail in Section 3.0.4.3, Method for Determining Significance under NEPA. For the purposes of the HSR Project EIR/EIS document, the evaluation of NEPA impact significance does not use intensity gradations. Use professional judgment when considering the context and intensity of an effect to determine the significance of impacts. Consider all relevant aspects of context (e.g., existing resource conditions, resource sensitivity) and appropriate factors of intensity (e.g., extent of change, duration of change), and implementation of mitigation measures for determining impact significance.

Context means the affected environment in which a proposed project occurs. Factors related to context are:

- Resource condition (e.g., CRAM score, population of species, etc.)
- Applicable land use plan, policy, or regulation of an agency with land use or development jurisdiction within the project area (including, but not limited to the regional habitat plans, critical habitat, wildlife linkages, etc.)
- Relative sensitivity to change instigated by potential project effects (e.g., endangered species, vernal pools, isolated populations, etc.)

Intensity refers to the severity of the effect, which is examined in terms of the type, quality, location and extent of the effect, duration of the effect (short- or long-term) and other considerations. Both adverse and beneficial effects are identified and described. When there is no measurable effect, impact is found not to occur. Context and intensity are considered together when determining whether an impact is significant under NEPA.

3.7.4.8 Method for Determining Significance under CEQA

Based on the CEQA Guidelines, the project would have a significant impact on biological resources if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFW or USFWS
- Have a substantial adverse effect on federally protected wetlands, as defined by CWA Section 404 (including seasonal wetlands, canals, ditches, lacustrines, retention and detention basins, and seasonal riverine) through direct removal, filling, hydrological interruption, indirect or cumulative effects, or other means
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance
- Conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, state, or federal HCP

Mandatory findings of significance within CEQA Guidelines Section 15065 require the lead agency to determine whether a project may have a significant effect on the environment where substantial evidence indicates that negative impacts may occur to biological resources. The negative conditions are defined as (1) the project has the potential to substantially degrade the quality of the environment, reduce habitat of wildlife species, cause wildlife populations to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce or restrict the range of a listed species; (2) the project has the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals; and (3) the project has environmental effects that are individually limited but cumulatively considerable. Under CEQA's mandatory findings of significance, the project would result in a significant impact if it would:

- Substantially reduce the habitat of a fish or wildlife species
- Cause a fish or wildlife population to drop below self-sustaining levels
- Threaten to eliminate a plant or animal community
- Substantially reduce the number or restrict the range of an endangered, rare, or threatened species

General indicators of significance, based on guidelines or criteria in NEPA, CEQA, CWA, CESA, FESA, and regulatory guidance from FRA include:

- Potential modification or destruction of habitat, movement corridors, or breeding, feeding, and sheltering areas for endangered, threatened, rare, or other special-status species
- Potential measurable degradation of protected habitats, sensitive vegetation communities, wetlands, or other habitat areas identified in plans, policies, or regulations
- Potential loss of a substantial number of any species that could affect the abundance or diversity of that species beyond the level of normal variability
- Potential indirect impacts, both temporary and permanent, from excessive noise that elicits a negative response and avoidance behavior

3.7.5 Affected Environment

Describe the regional setting and provide a concise summary description of the existing sensitive biological resources along the proposed HSR project segments and at proposed HSR facilities. Table 3.7-4 identifies key information and sources for constructing the regional setting.

Table 3.7-4 Key Information and Sources for the Regional Setting

Key Information	Sources of Information
Project's regional setting, which may vary by topical section, encompassing areas appropriate to the topic of analysis—RSA(s) used for regional analysis within each section	▪ CNDDB records search for the associated quads, including surrounding U.S. GS 7.5-minute quadrangles and the CNDDC Quickviewer ▪ CNPS Inventory of Rare and Endangered Plants of California (most current) ▪ USFWS, NMFS, and CDFW species list for applicable counties ▪ USFWS and NMFS recovery plans and critical habitat ▪ Applicable City and County general plans ▪ Soil survey for appropriate area, California ▪ Relevant CEQA/NEPA documents ▪ HCPs/NCCPs

Also describe the following.

- The existing sensitive biological resources in the RSAs. Mapping may be used to show the locations of protected or regulated habitats. These resources include:
  - Biological Resources—The plants, wildlife, and habitats that occur, or have the potential to occur, within the biological RSA. This includes biological resources associated with aquatic resources related to waters of the U.S., waters of the state, isolated water features, and other water bodies.
  - Special-status Species—Defined as any species that has been afforded special recognition by federal, state, or local resources agencies (e.g., USFWS, USFS, CDFW, county and city HCPs, and conservation organizations (e.g., CNPS)).
  - Special Aquatic Resources (e.g., seasonal wetlands, vernal pools)—Jurisdictional features under CWA Section 404 and Section 401 or CFGC Section 1600 et seq. This includes special aquatic resources determined to be important by water boards, such as waters of the state.
  - Critical Habitats—Areas designated by the USFWS that are either occupied by species that are federally listed as threatened or endangered or that provide them with suitable habitat and within which are found the geographical and physical features that are essential to the conservation of the species. As defined under the FESA, conservation is defined as *any and all methods and procedures used to bring a species to recovery; the point at which the protections of the FESA are no longer needed.*
- Established local policies concerning the context of sensitive biological resources-related impacts.
- Pertinent stakeholder issues and concerns from public outreach efforts and personal contact with local agencies.

The following series of tables identify the key information and sources of information for developing the description of biological resources.

3.7.5.1 Biological Communities (land cover types)

Table 3.7-5 Key Information and Sources for Biological Communities

Key Information	Sources of Information
Biological communities (assemblages of species, both plant and wildlife, forming communities) and wildlife habitats that occur in the investigation area	Results of pre-field review of aerial photographs and habitat assessment survey, using the current version of the *List of Terrestrial Natural Communities of California* prepared by CDFW. As appropriate other classifications determined to be acceptable to CDFW and USFWS may be used in conjunction with the standard list after coordination with PMT

3.7.5.2 Special-Status Species

Table 3.7-6 Key Information and Sources for Special-Status Species

Key Information	Sources of Information
▪ Habitat conditions, including potentially important landscape linkages that could support and facilitate the movement and dispersal of substantial numbers of species between blocks of open space essential for long-term plant/wildlife viability ▪ Biological Assessment (if needed), per USFWS and NMFS regulations	▪ Results of habitat assessment and special-status plant and wildlife surveys ▪ Results of agency and species expert contacts ▪ USFWS recovery plans, including core areas for recovery ▪ Results of previous environmental and planning documents

3.7.5.3 Critical Habitats/EFH

Table 3.7-7 Key Information and Sources for Critical Habitats

Key Information	Sources of Information
Critical habitat/EFH in the project area (as defined by the USFWS/NMFS)	USFWS website and recovery plans and GIS, if necessary, to determine if critical habitat/EFH is present in the project area

3.7.5.4 Wildlife Movement/Migration Corridors

Wildlife movement/migration corridors link together areas of wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. The fragmentation of open space areas by urbanization tends to create isolated islands of wildlife habitat. The fragmentation of wildlife habitat into isolated islands is especially detrimental to threatened or endangered species that are subject to localized extirpations due to natural or human-induced causes. Wildlife movement and migration corridors allow for the recolonization of areas that may have experienced greatly reduced populations or localized extirpations. Wildlife movement and migration corridors also allow for genetic mixing and flow between otherwise segregated populations of a species.

Table 3.7-8 Key Information and Sources for Wildlife Movement/Migration Corridors

Key Information	Sources of Information
▪ Location and type of movement or migration corridors and the species it would apply to ▪ Habitat conditions (including potentially important landscape linkages that could support and facilitate the movement and dispersal of substantial numbers of species between blocks of open space essential for long-term plant/wildlife viability) ▪ Landscape Permeability Plan (information on potential wildlife crossing structures and expected landscape permeability for wildlife movement), if needed ▪ Wildlife Crossings Memorandum (describes avoidance, minimization measures and proposed wildlife crossings), if needed	▪ USFWS and CDFW and specific species contacts ▪ Literature on movement and migration corridors and habitat linkages ▪ Aerial photographs and field surveys to determine potential for movement or migration corridors

3.7.5.5 Wetlands and Other Waters of the U.S.

Wetlands and other waters of the U.S., including lakes, rivers, and streams, are afforded protection under federal and state laws. Special aquatic resources, which include seasonal wetlands and vernal pools, are considered an important subset of these waters because of their importance to plant and wildlife species.

Table 3.7-9 Key Information and Sources for Wetlands and Other Waters of the U.S.

Key Information	Sources of Information
▪ Description of study methodologies ▪ Background information on the CWA (e.g., USACE and SWRCB) and CDFW permitting ▪ Data needs and documentation requirements under the Authority's NEPA/Section 404/408 Integration Agreement ▪ Description of vegetation, soils, and hydrology in the project study area pursuant to the USACE Wetland Delineation Manual (Environmental Laboratory 1987) and the guidance detailed in A Field Guide to Lake and Streambed Alteration Agreements Sections 1600-1607 (Environmental Services Division, January 1994) ▪ Map depicting the field survey results ▪ Wetland Delineation Report ▪ Watershed Evaluation Report (in support of the preliminary LEDPA) ▪ CRAM Analysis Report ▪ Draft Compensatory Mitigation Plan	▪ Results of wetland delineation survey ▪ Wetland Delineation Manual (Environmental Laboratory, most current) ▪ A Field Guide to Lake and Streambed Alteration Agreements Sections 1600-1607 (Environmental Services Division, most current)

3.7.6 Environmental Consequences

General formatting and terminology for constructing the discussion of environmental consequences is provided in Section 3.0.6, Environmental Consequences. The following direction is specific for the evaluation of Biological Resources and Wetlands. The heading structure for the Biological Resources and Wetlands EIR/EIS discussion is shown in Section 3.7.11.

Give each impact a short descriptive title, and number, e.g., *Impact Bio #1 The HSR project would permanently convert XX acres of wetlands to transportation use.* Explain the results of the analysis prescribed in Section 0. In particular, describe how the activity or physical change causes an impact upon the resource. For example: *Indirect impacts on special-status plant species and native plant species would potentially include erosion, siltation, and runoff into natural and constructed watercourses; soil and water contamination from construction equipment leaks; construction dust affecting plants by reducing their photosynthetic capability (especially during flowering periods); and an increased risk of fire (e.g., construction equipment use and smoking by construction workers) in adjacent open spaces.* The impacts assessment shall reach separate conclusions on the NEPA and CEQA conclusions. Simplify impact discussions whenever possible with references or citations to the more detailed information in the appendices. Use tables whenever possible to summarize the impacts and simplify the text.

3.7.7 Mitigation Measures

General formatting and terminology for constructing the discussion of mitigation measures is provided in Section 3.0.7, Mitigation Measures. The following direction is specific for the evaluation of Biological Resources and Wetlands. Present the mitigation measures associated with the project alternatives within each geographic segment under the subheadings of Construction and Operations. The heading structure for the Biological Resources and Wetlands EIR/EIS discussion is shown in Section 3.7.11.

Develop project-level measures that are consistent with adopted program and project strategies that avoid or minimize impacts. Begin by considering programmatic mitigation strategies described in the General Methodology Guidance, and the biological resources and wetlands technical reports and environmental document sections in the most recent HSR project environmental documents produced by the Authority (e.g., *Fresno to Bakersfield Section Final EIR/EIS*, or more recent HSR project EIR/EIS), as applicable to the HSR project section.

Identify section-specific measures to mitigate any significant impacts, such as seasonal (breeding) restrictions associated with grading activities. Draft the mitigation measures to facilitate transition into the Mitigation Monitoring and Enforcement Plan by clearly identifying responsibility and timing for implementation, as appropriate. For example:

> ***Bio-MM#7. Delineate Environmentally Sensitive Areas and Environmentally Restricted Areas (on plans and in-field).*** *Before the start of ground-disturbing activities, the Project Biologist will verify that environmentally sensitive areas and environmentally restricted areas (ERA) are delineated on final construction plans (including grading and landscape plans) and in the field and will update as necessary. Environmentally sensitive areas are areas within the construction zone, or on compensatory mitigation sites, containing suitable habitat for special-status species and habitats of concern that may allow construction activities but have restrictions based on the presence of special-status species or habitats of concern at the time of construction. ERAs are sensitive areas that are typically outside the construction footprint that must be protected in place during all construction activities. Before the start of ground-disturbing activities, the Contractor's Biologist will include all environmentally sensitive areas and ERAs on final construction plans (including grading and landscape plans). The Project Biologist will review and approve the map of all environmentally sensitive areas and ERAs on the design drawings and work with the designer to update the map as necessary.*
>
> *Before and during the implementation of ground-disturbing activities, the Contractor's Biologist, under the supervision of the Project Biologist, will mark environmentally sensitive areas and ERAs with high-visibility temporary fencing, flagging, or other agency-approved barriers to prevent encroachment of construction personnel and equipment. Two categories, environmentally sensitive areas and ERAs, will be separately designated in the field (e.g., using different colored flagging/fencing). Sub-meter accurate Global Positioning System (GPS) equipment will be used to delineate all environmentally sensitive areas and ERAs. The Contractor will remove environmentally sensitive area and ERA fencing when construction is complete or when the resource has been cleared according to agency permit conditions in the MMRP and construction drawings and specifications. The Project Biologist will submit a memorandum regarding the field delineation and installation of all Environmentally Sensitive Areas/ERAs to the Mitigation Manager.*

3.7.8 Impacts from Implementing Mitigation Measures

General guidance for evaluating the impacts of implementing mitigation measures is provided in Section 3.0.8, Impacts from Implementing Mitigation Measures. Consider and disclose both positive and negative impacts of mitigation measures as part of the analysis of impacts to Biological Resources and Wetlands. For example, creating a wetland off-site on prime agricultural land, while ensuring maintenance of wetlands (beneficial effect), would result in a net loss of prime farmland (adverse effect). Evaluate all mitigation measures, including off-site measures, using the methods in Section 0. Determine probable impacts using actual, on-the-ground analysis and describe the substantial basis for analytical conclusions (including defined thresholds or other criteria). When the impacts of mitigation measures cannot be quantified (e.g., at a specific location, in a definite extent, at a particular time or duration, or measurable alteration of the affected resource), evaluate potential impacts using clearly described assumptions based upon reasonably foreseeable outcomes.

For brevity, the Volume 1 EIR/EIS subsection can provide a summary explanation when the details of analyses and conclusions are documented in a Volume 2 technical appendix (covering all potential impacts from implementing mitigation measures).

3.7.9 Impacts Summary

3.7.9.1 NEPA Impacts

The overall structure and content of this discussion is presented in Section 3.0.9.1, NEPA Impacts. The heading structure for this organizational scheme is shown in Section 3.7.11. Use maps, as appropriate, to show locations of significant impacts of alternatives by project segment.

3.7.9.2 CEQA Impacts

The overall structure and content of this discussion is presented in Section 3.0.9.2, CEQA Significance Conclusions. The heading structure for this organizational scheme is shown in Section 3.7.11. Use maps, as appropriate, to show locations of significant unavoidable impacts of alternatives by project segment.

3.7.10 Products

The RC is responsible for preparing the following products, under Authority and FRA direction, according to PMT guidance and subject to PMT quality control and assurance.

In addition to the Volume 1 impacts analysis chapter, provide technical reports and Volume 2 appendices where full analysis applicable to the HSR project section requires details in excess of efficient inclusion in the EIR/EIS Volume 1 chapter. For example:

1. Volume 2, Appendix 2-E, Project Impact Avoidance and Minimization Features Analysis
2. Volume 2, Appendix 3.1-B, Regional and Local Policy Inventory
3. Volume 2, Appendix 3.7-A, Biological Resources and Wetlands-related Appendices in recent EIR/EIS
4. Biological Resources and Wetlands Technical Report
5. Wetland Delineation Report
6. Watershed Evaluation Report
7. Biological Assessment (if needed)
8. NEPA/404/408 Checkpoint A Package
9. NEPA/404/408 Checkpoint B Package

10. NEPA/404/408 Checkpoint C Package (including Draft Compensatory Mitigation Plan)
11. CRAM Analysis Report (California Rapid Assessment Methodology)
12. Landscape Permeability Plan (if needed)
13. Wildlife Crossings Memorandum (if needed)

3.7.10.1 Project EIR/EIS Volume 1

1. Summary/Table for EIR/EIS Executive Summary
2. Project Description—Biological Resources and Wetlands-related Components (as applicable to HSR project section):
   a. Impact Avoidance and Minimization Features
   b. Summary Table of Impact Avoidance and Minimization Features and Project Impacts
3. Affected Environment, Environmental Consequences and Mitigation Measures Section: Biological Resources and Wetlands
4. Affected Environment, Environmental Consequences and Mitigation Measures Section: Cumulative Impacts
5. Coordination Section (summarizes results of discussions with resources agencies in tabular format (e.g., changes to approach, changes to thresholds for X species, etc.), for incorporation into the EIR/EIS.

3.7.11 Biological Resources and Wetlands EIR/EIS Outline

The RC will use the following outline for organizing content related to the Biological Resources and Wetlands in Chapter 3 of the project EIR/EIS, using the heading hierarchy and format as indicated. The RC shall consider the impacts of implementing mitigation measures in Section 3.7.7.

3.7 Biological Resources and Wetlands
- 3.7.1 Introduction
  - 3.7.1.1 Key Definitions
- 3.7.2 Laws, Regulations, and Orders
  - 3.7.2.1 Federal
  - 3.7.2.2 State
  - 3.7.2.3 Regional and Local
- 3.7.3 Regional and Local Policy Analysis
- 3.7.4 Methods for Evaluating Impacts
  - 3.7.4.1 Definition of Resource Study Area
    - RSA 1
    - RSA 2
    - RSA 3
    - RSA N
  - 3.7.4.2 Pre-Field Investigation and Consultation
  - 3.7.4.3 Field Surveys
  - 3.7.4.2 Method for Determining Significance under NEPA
  - 3.7.4.3 Method for Determining Significance under CEQA
- 3.7.5 Affected Environment
  - 3.7.5.1 Project Segment 1
    - Alternative 1
    - Alternative 2
    - Alternative 3
    - Alternative N

- 3.7.5.2 Project Segment 2
  - Alternative 1
  - Alternative 2
  - Alternative 3
  - Alternative N
- 3.7.5.3 Project Segment 3
  - Alternative 1
  - Alternative 2
  - Alternative 3
  - Alternative N
- 3.7.5.4 Project Segment N
  - Alternative 1
  - Alternative 2
  - Alternative 3
  - Alternative N

3.7.6 Environmental Consequences

- 3.7.6.1 Overview
- 3.7.6.2 Project Segment 1
  - No Project
  - Alternative 1
    - Construction Impacts
    - Operations Impacts
  - Alternative 2
    - Construction Impacts
    - Operations Impacts
  - Alternative 3
    - Construction Impacts
    - Operations Impacts
  - Alternative N
    - Construction Impacts
    - Operations Impacts
- 3.7.6.3 Project Segment 2
  - No Project
  - Alternative 1
    - Construction Impacts
    - Operations Impacts
  - Alternative 2
    - Construction Impacts
    - Operations Impacts
  - Alternative 3
    - Construction Impacts
    - Operations Impacts
  - Alternative N
    - Construction Impacts
    - Operations Impacts
- 3.7.6.4 Project Segment 3
  - No Project
  - Alternative 1
    - Construction Impacts
    - Operations Impacts
  - Alternative 2
    - Construction Impacts
    - Operations Impacts

Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.7.6.5 Project Segment N
No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.7.7 Mitigation Measures
3.7.7.1 Project Segment 1
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.7.7.2 Project Segment 2
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.7.7.3 Project Segment 3
Alternative 1
Construction Measures
Operations Measures

3.8 Hydrology and Water Resources

The methodology guidelines in this section are organized by a sequence of steps for preparing an environmental document. Section 3.8.11 provides an outline for this environmental impact report/environmental impact statement (EIR/EIS).

Section 3.0, General Methodology Guidance for Resource Sections, provides the methodological framework common to the evaluation of all resource areas. Information about issues related to hydrology and water resources, such as stream crossings, irrigation canals, drainage ditches, stormwater systems may be included in Sections 3.6, Public Utilities and Energy; 3.7, Biological Resources and Wetlands; 3.9, Geology, Soils, Seismicity, and Paleontology; 3.10, Hazardous Materials and Wastes; and 3.14, Agricultural Lands. Information on water availability is presented in Section 3.6, Public Utilities and Energy. Historical ditches and other water conveyances are described in Section 3.17, Cultural Resources. Use these sections in combination with this Hydrology and Water Resources guidance section when developing the EIR/EIS analyses.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the resource section. Example text that illustrates the concepts and methods is shown in *italics*. The methods are organized to mirror the organization of the EIR/EIS section or chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

If there is a discrepancy between the material in this guidance and any adopted federal and state agency guideline or manual applicable to hydrology or water resources, the agency guideline or manual controls. Identify and discuss any such discrepancy with the California High-Speed Rail Authority (Authority), Federal Railroad Administration (FRA), and the Program Management Team (PMT) before deviating from this guidance.

3.8.1 Introduction

The general method for preparing an introduction for this resource section is provided in Section 3.0.1, Introduction. The following discussion presents direction specific to Hydrology and Water Resources.

Refer specifically to related content in other sections of the EIR/EIS that influence or are influenced by the Hydrology and Water Resources impact analysis (e.g., biological resources, public utilities and energy, hazardous materials and wastes, and cumulative) and supportive/ associated technical documents. References to other documents must include citation to specific sections (by lowest heading tier, e.g., 3.X.X), not just a general reference to a chapter in the EIR/EIS.

3.8.2 Laws, Regulations, and Orders

Federal, state, and local laws, regulations, orders or plans germane to hydrology and water resources in the geographic area that is affected by the project are presented below. General National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) requirements for assessment and disclosure of environmental impacts are described in Section 3.1, Introduction, and are therefore not restated in the resource section of the chapter.

3.8.2.1 Federal

Procedures for Considering Environmental Impacts (64 Fed. Reg. 28545)

These Federal Railroad Administration (FRA) procedures state that an EIS should consider possible impacts on water quality and flood hazards and floodplains.

Clean Water Act (33 U.S.C. § 1251 et seq.)

The Clean Water Act (CWA) is the primary federal law protecting the quality of the nation's surface waters, including lakes, rivers, and coastal wetlands. The CWA prohibits any discharge of pollutants into the nation's waters unless specifically authorized by a permit. The applicable sections of the CWA are further discussed below.

- Section 102 requires the planning agency of each state to prepare a basin plan to set forth regulatory requirements for protection of surface water quality, which include designated beneficial uses for surface water bodies, as well as specified water quality objectives to protect those uses. Analysis of the degree to which discharges of runoff from the Project may or may not adversely affect Project receiving water beneficial uses and attainment by the receiving water of assigned water quality objectives indicates the degree to which the Project may affect water quality of existing surface waters.
- Section 303(d) requires each state to provide a list of impaired surface waters that do not meet or are expected not to meet state water quality standards as defined by that section. It also requires each state to develop total maximum daily loads (TMDL) of pollutants for impaired water bodies. The TMDL must account for the pollution sources causing the water to be listed.
- Under Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of a dredged or fill material into waters of the U.S. must obtain certification that the discharge of fill will not violate water quality standards, including water quality objectives and beneficial uses. The certification is issued by the state in which the discharge would originate or from the interstate water pollution control agency with jurisdiction over affected waters. In California, the Regional Water Quality Control Boards (RWQCB) and the State Water Resources Control Board (SWRCB) issue Section 401 certifications.
- Under Section 402, all point source discharges, including, but not limited to, construction-related runoff discharges to surface waters and some post-development, are regulated through the National Pollutant Discharge Elimination System (NPDES) program. Project sponsors must obtain an NPDES permit from SWRCB.
- Under Section 404, the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (USEPA) regulate the discharge of dredged and fill materials into the waters of the U.S. Project sponsors must obtain a permit from USACE for discharges of dredged or fill materials into proposed jurisdictional waters over which the USACE determines that it will exert jurisdiction.

Rivers and Harbors Act of 1899 (33 U.S.C. § 401 et seq.)/General Bridge Act of 1946 (33 U.S.C. § 525 et seq.)

The Rivers and Harbors Act is a primary federal law regulating activities that may affect navigation on the nation's waterways, including:

- Section 9 of the Rivers and Harbors Act and Section 9 of the General Bridge Act require a U.S. Coast Guard permit for the construction of bridges and causeways over certain navigable waters of the U.S. to ensure marine traffic is not adversely affected. Section 9 bridge permits are only required for waters that are currently or potentially navigable for commerce; general recreational boating is typically not sufficient to establish jurisdiction. Navigable waters are defined as those water bodies subject to the ebb and flow of the tide or that are utilized currently, potentially, or historically in their natural condition or by reasonable improvements, as means to transport interstate or foreign commerce.
- Section 10 of the Rivers and Harbors Act requires authorization from USACE for the construction of any structure in or over any navigable waters of the U.S.

- Section 14 of the Rivers and Harbors Act requires USACE permission for the use, including modifications or alterations, of any flood control facility work built by the U.S. to ensure that the usefulness of the federal facility is not impaired. The permission for occupation or use is to be granted by an appropriate real estate instrument in accordance with existing real estate regulations. USACE permission is granted through the issuance of a Section 408 permit.

Floodplain Management (USEO 11988) and U.S. DOT Order 5650.2 (Floodplain Management and Protection)

U.S. Presidential Executive Order (USEO) 11988 requires that federal agency construction, permitting, or funding of a project must avoid incompatible floodplain development, be consistent with the standards and criteria of the National Flood Insurance Program, and restore and preserve natural and beneficial floodplain values. U.S. DOT Order 5650.2 contains policies and procedures for the transportation agencies to implement USEO 11988 on transportation projects.

Protection of Wetlands (USEO 11990)

USEO 11990 aims to avoid direct or indirect impacts to wetlands from federal or federally approved projects when a practicable alternative is available. If wetland impacts cannot be avoided, all practicable measures to minimize harm must be included.

National Flood Insurance Act (42 U.S.C. § 4001 et seq.) and Flood Disaster Protection Act (42 U.S.C. §§ 4001 to 4128)

The purpose of the National Flood Insurance Act is to identify flood-prone areas and provide insurance. The act requires purchase of insurance for buildings in special flood-hazard areas. The act is applicable to any federally assisted acquisition or construction projects in an area identified as having special flood hazards. Projects should avoid construction in, or develop a design to be consistent with, Federal Emergency Management Agency (FEMA)-identified flood-hazard areas.

The Flood Disaster Protection Act requires the purchase of insurance for buildings in special flood-hazard areas identified and mapped by FEMA.

Safe Drinking Water Act of 1974 (42 U.S.C. § 300 et seq.)

The Safe Drinking Water Act was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The Act authorizes EPA to set national health-based standards for drinking water to protect against both naturally occurring and human-produced contaminants that may be found in drinking water. The Act applies to every public water system in the U.S.

The Sole Source Aquifer Protection Program is authorized by Section 1424(e) of the Act. The Sole Source Aquifer designation is a tool to protect drinking water supplies in areas where there are few or no alternative sources to the groundwater resource and where, if contamination occurred, using an alternative source would be extremely expensive. All proposed projects receiving federal funds are subject to USEPA review to ensure that they do not endanger the water source.

3.8.2.2 State

Porter-Cologne Water Quality Control Act (Cal. Water Code, § 13000 et seq.)

The Porter-Cologne Water Quality Control Act requires the regulation of all pollutant discharges, including wastes in Project runoff that could affect the quality of the state's water. Any entity proposing to discharge a waste must file a Report of Waste Discharge with the appropriate RWQCB or SWRCB. The RWQCBs are responsible for implementing CWA Sections 401, 402, and 303(d). Because the HSR project is a project of statewide importance, any Reports of Waste Discharge will be filed with SWRCB. The act also provides for the development and periodic reviews of basin plans that designate beneficial uses of California's major rivers and groundwater basins and establish water quality objectives for those waters.

Construction Activities, National Pollutant Discharge Elimination System General Construction Permit

Under the federal CWA, discharge of stormwater from construction sites must comply with the conditions of an NPDES permit. The SWRCB is the permitting authority in California and has adopted the statewide General Permit for Stormwater Discharges Associated with Construction Activity that applies to projects resulting in 1 or more acres of soil disturbance. For projects disturbing more than 1 acre of soil, a construction stormwater pollution prevention plan (SWPPP) is required that specifies site management activities to be implemented during site development. These management activities include construction stormwater best management practices (BMP), erosion and sedimentation controls, dewatering (nuisance-water removal), runoff controls, and construction equipment maintenance, as described below in Section [x.x.x], Project Design Features.

The Central Valley RWQCB requires a Notice of Intent to be filed before any stormwater discharge from construction activities and requires that the SWPPP be implemented and maintained onsite. On July 1, 2010, the statewide General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (SWRCB Water Quality Order No. 2009-0009-DWQ, NPDES No. CAS000002) superseded the previous statewide General Permit. This permit was later revised by Order No. 2010-0014-DWQ and Order No. 2012-006-DWQ. The new statewide permit implements a risk-based permitting approach, specifies minimum BMP requirements, and requires stormwater monitoring and reporting.

National Pollutant Discharge Elimination System General Industrial Permit

Another required permit is the statewide General Permit for Discharges of Stormwater Associated with Industrial Activities (SWRCB Water Quality Order No. 97-03-DWQ, NPDES No. CAS000001). Qualifying industrial sites are required to prepare SWPPPs describing BMPs that will be employed to protect water quality. Industrial facilities are required to use best conventional pollutant control technology for control of conventional pollutants and best available technology economically achievable for toxic and non-conventional pollutants. Monitoring runoff leaving the site is also required. For transportation facilities, this permit applies only to vehicle maintenance shops and equipment-cleaning operations. The state is currently updating this general permit and received public input on the draft permit in 2014. Changes to the permit are expected to include the establishment of numeric action levels that reflect Cal. EPA benchmark values for selected parameters, minimum BMP requirements, a revised monitoring protocol, and exceedance response actions if a numeric action level is exceeded.

Caltrans National Pollutant Discharge Elimination System Statewide Stormwater Permit

The California Department of Transportation (Caltrans) operates under a permit (Order No. 2012-0011-DWQ, NPDES No. CAS000003) that regulates stormwater discharge from Caltrans properties, facilities, and activities and requires that the Caltrans construction program comply with the adopted statewide General Permit for Stormwater Discharges Associated with Construction Activity (described above). The permit requires Caltrans to implement a year-round program in all parts of the state to effectively control stormwater and non-stormwater discharges (SWRCB 2012). The Caltrans permit is applicable to portions of the project that involve modifications to state highways.

Cobey-Alquist Flood Plain Management Act (Cal. Water Code, § 8400 et seq.)

The Cobey-Alquist Flood Plain Management Act encourages local governments to adopt and enforce land use regulations to accomplish floodplain management. It also provides state assistance and guidance for flood control.

The following boilerplate text for the Central Valley Flood Protection Act of 2008 and the California Flood Protection Board are only applicable to project sections located in the Central Valley.

Central Valley Flood Protection Act of 2008 (Cal. Water Code, § 9600)

The Central Valley Flood Protection Act of 2008 establishes the 200-year flood event as the minimum level of flood protection for urban and urbanizing areas. As part of the state's FloodSafe program, those urban and urbanizing areas protected by flood control project levees must receive protection from the 200-year flood event level by 2025. The California Department of Water Resources (DWR) and the Central Valley Flood Protection Board (CVFPB) collaborated with local governments and planning agencies to prepare the Central Valley Flood Protection Plan (CVFPP), which was adopted on June 29, 2012. The objective of the CVFPP is to create a system-wide approach to flood management and protection improvements for the Central Valley and San Joaquin Valley).

Central Valley Flood Protection Board Regulations (Cal. Code Regs., tit. 23, Division 1, Tier 1b Updates, and Division 1.5)/(Cal. Water Code, § 8710 et seq.)

The CVFPB exercises regulatory authority within its jurisdiction to maintain the integrity of the existing flood control system and designated floodways by issuing permits for encroachments. The CVFPB has mapped designated floodways along more than 60 streams and rivers in the Central Valley. In addition, Table 8.1 of the California Code of Regulations, Title 23 contains several hundred stream reaches and waterways that are regulated streams. Projects that encroach within a designated floodway or regulated stream, or within 10 feet of the toe of a state-federal flood control structure (levee), require an encroachment permit and the submission of an associated application, including an environmental assessment questionnaire. A project must demonstrate that it will not reduce the channel flow capacity and that it will comply with channel and levee safety requirements.

In cooperation with USACE, CVFPB enforces standards for the construction, maintenance, and protection of adopted flood control plans that will protect public lands from floods. The jurisdiction of CVFPB includes the Central Valley, including all tributaries and distributaries of the Sacramento River, the San Joaquin River, and designated floodways (23 Cal. Code Regs., § 2). CVFPB has all the responsibilities and authorities necessary to oversee future modifications as approved by USACE pursuant to assurance agreements with USACE and the USACE Operation and Maintenance Manuals under 33 C.F.R. Part 208.10 and 33 U.S.C. § 408.

Streambed Alteration Agreement (Cal. Fish and Game Code, §§ 1601 to 1603)

The California Fish and Game Code requires the Authority to notify the California Department of Fish and Wildlife prior to implementing any HSR project that would divert, obstruct, or change the natural flow or bed, channel, or bank of any river, stream (including intermittent streams), or lake.

3.8.2.3 Regional and Local

Compile a complete inventory of adopted local and regional plans, policies, ordinances, or guidelines related to water quality, floodplain management and hydrology, surface and groundwater resources, and grading. Include dewatering and stormwater management programs. Use a tabular format similar to that used in the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014), or more recent HSR project EIR/EIS, to organize and concisely report this information. This information will become part of Volume 2 Appendix 3.1-B Regional and Local Policy Inventory.

3.8.3 Regional and Local Policy Analysis

The overall structure of this discussion is presented in Section 3.0.3, Regional and Local Policy Analysis. As described in more detail in subsection 3.0.3.2, this analysis will describe any inconsistency or conflict with adopted regional or local policies and implementation of the HSR project.

3.8.4 Methods for Evaluating Impacts

Evaluation of impacts on hydrology and water quality is a requirement of the CWA, CEQA, and NEPA. List each of the hydrology and water resources and crossings of hydrologic features in the corridor based on applicable mapping sources. In addition, describe prior and on-going efforts to avoid impacts on hydrology and water resources—for example the Authority's collaboration with the signatory agencies of the Sustainability Memorandum of Understanding to improve watershed health across the state through designing and building facilities with water efficiency and conservation and through the use of green infrastructure for stormwater management—and include reference to impact avoidance and minimization features described in Section 2.5.2, HSR Build Alternatives. This section describes the methods for developing the resource study area (RSA) and for evaluating effects on surface water quality, water supply, drainage, groundwater supply and quality, and impacts on floodplains under CEQA and NEPA. Subsequent sections in this guideline provide direction for the design of mitigation measures and the structure for presenting content related to hydrology and water resources in the EIR/EIS documents.

3.8.4.1 Definition of Resource Study Area

The RSA is the area in which all environmental investigations specific to hydrology and water resources are conducted in order to determine the resource characteristics and potential impacts of the Project Segment. The factors making up the RSA and the description of the elements comprising the RSA are provided in Section 3.0.4.1, Definition of Resource Study Area, and Section 3.0.4.2, Methodology for Impact Analysis.

The boundaries of the RSA for Hydrology and Water Resources extend beyond the project footprint to include tributary and receiving streams that are connected to resources within the project footprint and may be affected by changes within the project footprint. Focus the Hydrology and Water Resources impact analysis on the effects of the project on two types of water resources—surface waters and groundwater. The types of effects are changes to water quality and quantity. Construction and operation could change water quality and affect hydrology. The analysis is concerned with locations where the project footprint would be placed on or cross over surface waters. Evaluate the project's effects on floodplains and localized flooding patterns, including analysis of potential project effects upon the function and characteristics (e.g., capacity, water surface elevations, stage frequency, geomorphology) of floodplains and the movement of stormwater in local areas. The analysis requires an extended RSA to encompass the entirety of the floodplain and the possible change in flows upstream and downstream of a proposed structure. The RSA may need to be expanded in some areas to evaluate mitigation activities. For example, if an agricultural well needs to be moved, an assessment of the well relocation groundwater supplies would be required.

The physical and operational elements of the RSA are described in Table 3.8-1, which presents the required information sources and baseline metrics to help define the RSA.

The resource study area for cumulative effects will be a broader area depending on the project section and will consider adjacent HSR project sections to ensure consideration of impacts on a more regional and statewide basis. See Section 3.19, Methodology for Cumulative Impacts, for a more detailed discussion.

Table 3.8-1 Resource Study Area Information

Required Information	Resource Study Area
▪ Aerial maps ▪ Geographic Information System (GIS) base map ▪ Applicable basin plans ▪ Project description—HSR system, linear and sited facilities, stations, operations, ancillary improvements ▪ Project plans and profiles, other design materials in sufficient detail to complete environmental impact assessment of all proposed improvements and operations within the affected geographic area ("project footprint") – Design elements include the HSR project and related facilities, temporary access and construction/staging areas, utility improvements and connections, etc. ▪ Station locations and footprints in sufficient detail to complete environmental impact assessment of all construction and operations, regardless of implementation or operating entity ▪ Construction phases and interim build conditions/transitions for all project and ancillary improvements, and stations ▪ Design requirements of local maintaining agencies ▪ To the extend it is available, a preliminary jurisdictional delineation of wetlands and waters of the U.S. ▪ Drainage report ▪ following reports if they are determined necessary for the preparation of the preliminary engineering design: – Hydraulics study report – Floodplain Risk Assessment report – Scour report	▪ Surface hydrology and water quality RSA—Both sides of the right-of-way for each alternative alignment and the proposed project's physical ground disturbance footprint (e.g., stations, track, equipment storage areas, substations, temporary construction areas and easements) and receiving waters of project runoff – Use this to evaluate indirect impacts – Give particular attention to any areas where facilities would be located within or across surface water bodies including water conveyance facilities such as irrigation canals ▪ Hydrogeology and groundwater RSA—Aquifer(s) underlying the proposed project's physical ground disturbance footprint – Give particular attention to areas of high groundwater which could be encountered during excavation and grading activities – To the extent that it can be determined, describe the direction of groundwater flow – Consider connectivity to underlying aquifers, which may be used as a water supply ▪ Flooding RSA—FEMA-designated and DWR-designated flood-hazard areas located within the proposed project's physical ground disturbance footprint, as well as any areas where flood frequency, extent, and duration could be affected by the project – Consider the volume of runoff and project-related structures which could impede or redirect flood flows – Consider the extent to which an area is subject to flooding notwithstanding whether it is located in a flood hazard area.

3.8.4.2 Methodology for Impact Analysis

Group and consolidate information and discussion in the EIR/EIS to effectively present content to the lay audience (i.e., by distinct resource characteristic or component, surface water hydrology, water quality, groundwater, and floodplains, within segments defined in Chapter 2, Alternatives). Include a list of the water bodies crossed by the section alternatives or other detailed information on hydrology and water resource changes as a result of the proposed HSR alternatives as a technical appendix in Volume 2 of the EIR/EIS. Prepare a Volume 2 technical appendix that compiles the following information from Chapter 3 that is related to impacts upon Basin Plan(s) beneficial uses and informs CWA 401 Certification:

- 3.8.5 Affected Environment—List of all beneficial uses identified for water bodies within the Basin Plan that cross the RSA and list of Section 303(d) impaired waters within the vicinity of an HSR project alternative
- 3.8.6 Environmental Consequences—Inventory of water quality objectives from the Basin Plan, assessment of potential changes in amounts of pollutants relative to the water quality objectives or Section 303(d) TMDLs, assessment of potential changes in watercraft access to or navigation of affected Basin Plan water bodies, inventory of BMPs or avoidance or minimization features or HSR operations that are part of the project to control water quality and maintain navigation uses, and conclusions for impact significance under CEQA and NEPA
- 3.8.7 Mitigation Measures—Pertaining to water quality or navigation impacts, if any
- 3.8.9 Impact Conclusions—Summaries of significant impacts under CEQA and NEPA
- Affected Environment, Environmental Consequences, Mitigation Measures, and Impact Conclusions related to beneficial uses associated with 3.6 Public Utilities and Energy (municipal and domestic water supply, industrial process and service water supply, and power generation), 3.7 Biological Resources and Wetlands (freshwater habitat, estuarine habitat, wildlife habitat, specially significant habitats, special-status species, migration, spawning and rearing), 3.14 Agricultural Farmland and Forestland (irrigation, stock watering, aquaculture, and shellfish harvesting), and 3.15 Parks, Recreation, and Open Space (water contact, non-water contact, commercial and sport fishing).

Provide specific reference to the technical appendices in the hydrology and water resources section of Chapter 3 to help the reader navigate between volumes.

Begin analysis of impacts with consideration of impact avoidance and minimization features that are incorporated into the project in Section 2.5.2, HSR Build Alternatives, and evaluated in Volume 2, Appendix 2-E. Account for implementation of design features or best management practices, for example: *The project will be designed to both remain operational during flood events and to minimize increases in 100-year or 200-year flood elevations, as applicable to locale.*

Refer to the summary table of impact avoidance and minimization features and explain how particular features avoid impacts or ensure less-than-significant impacts to hydrology and water resources.

Analyze direct and indirect impacts related to hydrology and water resources through quantitative analysis and, where necessary, with qualitative analysis. Analyze impacts which may occur during construction and operation of the HSR system (*note*: the analytical results for construction impacts and operations impacts will be presented separately in the EIR/EIS). Table 3.8-2 identifies types of construction and operation impacts.

The methodology used to evaluate hydrology and water resources impacts is generally based on the CWA and Caltrans Standard Environmental Reference. Include a review of the data and impact analyses in the other sections prepared for the EIR/EIS, including biological resources, public utilities and energy, hazardous materials and hazardous wastes, and cumulative. The analysis should be based on a review of available reports and data (including federal and state statutes, resource agency, local, and regional agency policies and ordinances), discussions with agency representatives in the region, field investigation, hydrology and hydraulic modeling (where applicable), and professional judgment. Develop a GIS database for each project segment. Develop all GIS data (1) as part of project design or (2) from available federal, state, and local sources. Provide sufficient detail to allow complete analysis of anticipated design of the

Table 3.8-2 Source and Description of Hydrology or Water Quality Impacts

Source of Impacts	Description of Impacts
Construction activities with potential for impacts to hydrology and water due to temporary or permanent physical change on the landscape by project facilities, such as the guideway and supporting structures, HSR-related infrastructure and facilities, stations, parking structures/lots	▪ Soil-disturbing activity (e.g., excavation and grading), which can lead to erosion and sedimentation ▪ Use of construction-related hazardous materials, which could result in spills that would impact surface waters ▪ Excavation in areas of high groundwater, which could result in impacts to groundwater quality or quantity from dewatering activities and direct exposure of groundwater to sediment and other contaminants ▪ Construction within waterways, which could affect flows and water quality ▪ Construction within a designated flood zone, which could pose a risk to workers, alter the stage or flow characteristics of flood flows, or reduce the level of flood risk reduction afforded by protective infrastructure ▪ Landscaping and planting ▪ Increases in impervious surfaces as a result of the project, leading to increases in the timing and volume of water runoff ▪ Changes to or interruptions in the local drainage infrastructure as a result of the proposed project design, potentially leading to localized or regional drainage impacts (e.g., flooding) ▪ Creation of significant new sources of pollutants (e.g., parking lots and maintenance facilities), leading to new sources of contaminated runoff ▪ Location of project facilities below the naturally occurring water table, with potential impacts related to flooding of project facilities and changes in groundwater quality or quantity ▪ Location of project facilities within a designated floodplain (or area subject to flooding), exposing the project to risks related to flooding, as well as subjecting other areas to impacts resulting from changes in the location and or direction of flood flows ▪ Quantify impacts in manner appropriate for the type of water resources receiving the impacts
Operational impacts resulting from either ongoing rail service and maintenance activities of the HSR system	▪ Use of groundwater potentially causing local groundwater overdraft or depletion conditions ▪ Potential release of pollutants from maintenance activities into surface water bodies either directly or via stormwater conveyance

completed project or of reasonable assumptions for project implementation, including maintenance road access, all electrical and utility connections, and modifications. Focus analysis on the project's potential to alter drainage patterns, the volume or characteristics of site runoff, and the risk of personal injury, loss of life, and damage to property resulting from hydrologic and flooding conditions in the RSA(s). Identify where permit applications will be needed and provide analysis to support future permit review.

Identify the specific element of the impact that causes it to be significant. It is important to identify this element of the impact to clearly explain how the mitigation measure reduces that particular element of the impact. Table 3.8-3 lists the topics to be evaluated and includes suggestions about possible impact mechanisms.

Table 3.8-3 Hydrology, Water Quality, and Floodplain Impact Issues

Topic	Issues to Evaluate
Surface water hydrology	▪ Extent that the project may affect surface waters; erosion and sedimentation effects from soil disturbance during construction activities such as excavation and grading ▪ Increases in impervious surfaces as a result of the project, leading to increases in the timing and volume of water runoff ▪ Changes in drainage patterns (temporary and permanent) ▪ Discussion of the Stormwater Design Guidelines to demonstrate impact avoidance and minimization
Surface water quality	▪ Potential for the project to affect surface water quality from discharges associated with HSR construction ▪ Potential for the project to affect surface water quality from discharges associated with operation and maintenance activities ▪ Creation of significant new sources of pollutants (e.g., construction equipment, parking lots and maintenance facilities), leading to new sources of contaminated runoff ▪ Impact avoidance and minimization, through discussion of the Stormwater Design Guidelines
Groundwater	▪ Extent that the project may affect groundwater supplies during construction and operation (e.g., the use of groundwater for landscaping irrigation) of the HSR ▪ Excavation in areas of high groundwater, which could result in impacts to groundwater quality or quantity from dewatering activities and direct exposure of groundwater to sediment and other contaminants ▪ Location of project facilities below the naturally occurring water table, with potential impacts related to flooding of project facilities and changes in groundwater quality or quantity
Floodplains	▪ Extent that the project is within 100-year floodplain (in rural areas or small communities) or within the 200-year floodplain of rivers or streams that are regulated by the Sacramento-San Joaquin River Flood Protection Management System (in urban or urbanizing areas) ▪ Potential for the project to increase flood elevation and flow ▪ Location of project facilities within a designated floodplain, exposing the project to risks related to flooding, as well as subjecting other areas to impacts resulting from changes in the location and or direction of flood flows ▪ Potential for the project to result in incompatibility with floodplain development ▪ Construction within a designated flood zone and the potential for surface drainage to contribute to a flood event, which could pose a risk to workers

Use the following actions to analyze impacts to floodplains, surface water hydrology, surface water quality, and groundwater.

Surface Water Hydrology

- Identify the potential impacts to surface waters, using the GIS database layers for the proposed alternatives and the database layer for surface waters.
- Quantify potential impacts and present in tabular form.
- Determine linear impact for streams.
- Determine area impacts for other water bodies.
- Identify and incorporate design practices to avoid or minimize project impacts.
- Identify impact on maintenance access roads for canals.

Surface Water Quality

- Describe impacts to surface water quality from runoff and discharges associated with HSR construction.
- Consider accidental releases of construction-related hazardous materials, ground disturbance and associated erosion and sedimentation, stormwater discharges, and dewatering discharges, particularly in locations within or close to a surface water body (where applicable).
- Provide particular attention and detail in areas where work would be conducted in a surface water body, due to the potential for contaminating the water.
- Describe practices from SWPPP, including a spill prevention plan, that will avoid or minimize construction impacts.
- Describe impacts to surface water quality from discharges associated with operation and maintenance activities, focusing on stormwater runoff from facilities, given the Stormwater Design Guidelines for compliance with the Individual Section 402 NPDES Stormwater Permit. Explain why and how it reduces the significance of potential water quality impacts. Provide substantial evidence of the efficacy of the Stormwater Design Guidelines.
- Coordinate with design engineers to incorporate avoidance and minimization measures and include BMPs for pollution prevention, treatment, construction, and maintenance. Identify BMPs and, to the extent possible, provide information on which BMPs would be most appropriate and effective. Avoidance and minimization measures can be accomplished through these practices. Explain why and how the BMPs would reduce the significance of potential water quality impacts. Provide substantial evidence of the efficacy of the BMPs.

Groundwater

- Identify the potential impacts to groundwater, using the GIS database layers for the proposed alternatives and the database layer for groundwater.
- Consider the following for construction-related impacts:
  - Potential for contaminated site runoff to percolate to groundwater aquifer, particularly the cases where there is shallow groundwater
  - Areas where excavation activities would result in excursions below the groundwater table and direct mechanism for contaminants to enter groundwater
  - Volumes of dewatering and potential depletion of groundwater supplies

Floodplains

- Identify the potential impacts to the floodplains described in the applicable flood protection plan, using the GIS database layers for the proposed alternative alignments and the database layer for floodplains or FEMA and DWR floodplain maps if GIS data are not available.
- Quantify impacts and present in tabular form.
- Qualitatively discuss the potential of each alternative alignment to increase flood height or to divert flood flows.
- Qualitatively address incompatibility with floodplain development and preservation of floodplain values.
- Prepare *Floodplain Risk Assessment* for alternatives, as appropriate for a given section.

Apply the same impact thresholds in both project construction and operations timeframes. Use professional judgment when considering the context and intensity of an effect to determine the significance of impacts. Consider all relevant aspects of context (e.g., existing resource conditions, resource sensitivity) and appropriate factors of intensity (e.g., extent of change, duration of change) for determining impact significance. Also consider project actions that improve or otherwise benefit resource values in the evaluation of impact significance. For all impacts, determine significance of impacts under NEPA and CEQA based on application of the following methods.

Include the following information in the environmental document:

- A detailed map of sufficient scale to illustrate the geographic relationship of the alternatives to water features or resources
  - Do not exceed the extent of a project segment on the map boundary and clearly show the location and areal extent of project impacts and major landscape features (e.g., highways, major roads, local jurisdictions, perennial water bodies, or other geographical landmarks or features that convey relative location and size).
  - Obtain Authority, FRA, and PMT concurrence on mapping scale before preparing an administrative draft EIR/EIS.
- Size (acres) and location (e.g., maps or other exhibits such as photographs) of the affected water features or resources
- Function or type of affected water features or resources

3.8.4.3 Method for Determining Significance under NEPA

NEPA does not provide a definitive threshold to determine significant or potentially significant hydrology and water resources impacts, as described in more detail in Section 3.0.4.3, Method for Determining Significance under NEPA. For the purposes of the HSR Project EIR/EIS document, the evaluation of NEPA impact significance does not use intensity gradations. Use professional judgment when considering the context and intensity of an effect and efficacy of proposed mitigation measure(s) to determine the significance of impacts. Consider all relevant aspects of context (e.g., existing resource conditions, resource sensitivity) and appropriate factors of intensity (e.g., extent of change, duration of change) for determining impact significance.

3.8.4.4 Method for Determining Significance under CEQA

Based on the CEQA Guidelines, the project would result in a significant impact on hydrology and water resources (including water supply and quality) if it would:

- Violate any water quality standards or waste discharge requirements
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site
- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff
- Otherwise substantially degrade water quality
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map
- Place structures within a 100-year flood hazard area which would impede or redirect flood flows
- Expose people or structures to loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam
- Cause inundation by seiche, tsunami, or mudflow.

3.8.5 Affected Environment

Include a concise summary description of existing surface waters, groundwater basins, and floodplains along the proposed HSR alignments and at proposed HSR facilities. In particular:

- Identify all relevant surface waters, drainage patterns, groundwater basins, and floodplains. A map may be created to illustrate the locations of these features, alternatives, and proposed mitigation measures.
- Document established local and regional policies concerning the context of water quality and flood-related impacts.
- Describe pertinent stakeholder issues and concerns from public outreach efforts and personal contact with local agencies.
- Cross-reference all subsections of the EIR/EIS (by lowest heading tier, e.g., 3.X.X) that describe the resources or are related to hydrology and water resources (e.g., Biological Resources and Wetlands discusses different types of surface waters; Geology, Soils, Seismicity, and Paleontology discusses stormwater management infrastructure).

In most cases, investigations will consist of researching databases, maps, published and unpublished reports, and modeling. Field verification and site surveys are expected in rare occasions when localized information is necessary to develop the analysis and specific mitigation measures. Consultation and coordination with local maintaining agencies of federal and state flood protection and irrigation facilities is critical in the analysis of hydrology. Prepare meeting notes and

personal communications with these entities, reference in the section, and save in the administrative record.

Organize the Affected Environment in the following order presented for each of the geographic segments and alternatives, in turn:

- Climate, precipitation, and topography
- Surface water hydrology
- Surface water quality
- Groundwater
- Floodplains

Table 3.8-4 through Table 3.8-7 provide key information needed for a complete description of the Affected Environment and typical sources for the information.

Table 3.8-4 Key Information and Sources for Climate, Precipitation, and Topography

Key Information	Sources of Information
▪ Regional average, minimum, and maximum temperature ▪ Regional annual average precipitation, type (rain or snow), seasonality (months of greatest/least rainfall) ▪ Major topographic features, range of elevations, slope steepness, etc.	▪ Climate and Precipitation – Statewide Program EIS/EIR – California Data Exchange Center (http://cdec.water.ca.gov/) – Western Regional Climate Center (www.wrcc.dri.edu/) – California Irrigation Management Information System (CIMIS) (www.cimis.water.ca.gov/cimis/welcome.jsp) – California Climate Data Archive (www.calclim.dri.edu/) – National Elevation Dataset (http://ned.usgs.gov/) ▪ Topography (cross reference *Geology, Soils, and Seismicity* technical report and Program EIS/EIR) – U.S. Geologic Survey Topographic Maps and Digital Elevation Model (GIS data) – Detailed topographic data from Digital Terrain Model and Synthetic Aperture Radar ▪ Conceptual design and project plans and profiles ▪ Project description

Table 3.8-5 Key Information and Sources for Surface Water Hydrology, Water Quality, and Supply

Key Information	Sources of Information
▪ Broad-scale surface water hydrology – Major lakes, reservoirs, rivers, streams, canals, floodplains – GIS maps showing and labeling each of these ▪ Surface water quality—Major water quality impairments ▪ Groundwater basins—Major aquifers, volume, depths, quality, overdraft conditions if any ▪ Surface Waters (includes impaired bodies) – Identify surface waters (lakes, rivers, streams, creeks, and water conveyance facilities such as irrigation canals) within RSA(s). – Determine project effects on local agencies ability to maintain and operate water conveyance facilities. – Obtain available hydrology data pertaining to the identified lakes, rivers, streams or creeks. If the available information is not sufficient, determine if and what additional hydrology data is to be generated by the regional team. – Map as overlay using GIS and SPOT imagery. – Provide narrative summary of surface waters within RSA(s), referencing appendix containing mapping. – Identify CWA 303 (d) listed water bodies. ▪ Erosion ▪ Soils susceptible to erosion within RSA(s) ▪ Map as overlay using GIS and SPOT imagery ▪ Narrative summary of soil erosion potential within RSA(s), referencing appendix containing mapping	▪ Program EIS/EIR and Program technical reports prepared by regions for statewide system ▪ Water features – USGS Topographic Maps – Hydro 24 blueline – Layer 610 ▪ Irrigation and other water conveyance facilities ▪ Irrigation and Water Districts—Design standards, maintenance standards, websites, personal communications ▪ Water quality—Clean Water Act Section 303(d) list of water quality impaired segments; maintained by SWRCB and RWQCBs ▪ Highly erodible soils—STATSGO GIS databases

Table 3.8-6 Key Information and Sources for Groundwater Hydrology, Water Quality, and Supply

Key Information	Sources of Information
▪ Groundwater – Identify site-specific conditions with respect to aquifers and areas with shallow groundwater – Map as overlay using GIS and SPOT imagery – Narrative summary of any known groundwater quality impairments or threats	▪ Program EIS/EIR and Program technical reports prepared by regions for statewide system ▪ Groundwater—DWR Bulletin 118 (www.water.ca.gov/groundwater/bulletin118/bulletin118update2003.cfm) ▪ USGS Ground Water Atlas of United States (Planert and Williams 1995)

Table 3.8-7 Key Information and Sources for Floodplains

Key Information	Sources of Information
▪ Floodplain – Identify 100-year floodplains within RSA(s) using FEMA maps and FIRMS to show Special Flood Hazard Areas – Map as overlay using GIS and SPOT imagery – Provide narrative summary of floodplains in RSA(s), referencing appendix containing mapping ▪ Flood protection facilities – Determine project effects on the local maintaining agencies ability to maintain facilities – Evaluate potential effects of the project to impede flood fighting	▪ Program EIS/EIR and Program technical reports prepared by regions for statewide system ▪ Water features – USGS Topographic Maps – Hydro 24 blueline – Layer 610 ▪ Floodplains—FEMA maps; Flood Insurance Rate Map (FIRM) ▪ Flood protection facilities—Local maintaining agencies, design standards, websites, personal communications

3.8.6 Environmental Consequences

General formatting and terminology for constructing the discussion of environmental consequences is provided in Section 3.0.6, Environmental Consequences. The following direction is specific to the evaluation of Hydrology and Water Resources. The heading structure for this organizational scheme is shown in Section 3.8.11.

Give each impact a short descriptive title, e.g., *Temporary Alterations to Drainage Patterns and Stormwater Runoff,* as well as a number such as *HWQ #1.* Explain the results of the analysis prescribed in the Methods for Evaluating Impacts subsection. In particular, describe how the activity or physical change causes an impact upon the resource. For example: *Ground disturbance associated with site grubbing and grading will accelerate stormwater erosion and increase siltation of water bodies receiving stormwater runoff from construction sites*. Simplify impact discussions whenever possible with references or citations to the more detailed information in the appendices. Use tables whenever possible to summarize the impacts and simplify the text.

For NEPA and CEQA assessments, reach specific, separate conclusions about significance for each impact based on the significance criteria and methods defined in the NEPA and CEQA subsections of the Methods for Evaluating Impacts subsection. For example: *Temporary Alterations to Drainage Patterns and Stormwater Runoff. Temporary diversion of stream flow may be necessary during the installation of support piers and bridge abutments in stream channels. In some cases, flowing streams may be temporarily rerouted around construction areas located within the channel. This could temporarily reduce channel capacity, potentially cause erosion or sedimentation, degrading water quality, and could temporarily increase flood risk. Conventional construction techniques, such as cofferdams, would be used for in-stream work. Cofferdams would be designed to minimize increases in water surface elevations during the design flood event and as required by state or local agencies. Cofferdams would also be designed per the SWPPP, which would specify measures to reduce erosion and sedimentation. Project design standards are described in Chapter 2, Alternatives, and are listed in the technical appendix, Applicable Design Standards. Temporary changes to stormwater drainage patterns and runoff would be minimal and have a less-than-significant impact under NEPA and a less-than-significant impact under CEQA because stormwater would be infiltrated onsite or existing discharge locations would be maintained.*

If the significance conclusions of the NEPA and CEQA assessments are different, explain the difference on the basis of the significance criteria and methods.

3.8.7 Mitigation Measures

General formatting and terminology for constructing the discussion of mitigation measures is provided in Section 3.0.7, Mitigation Measures. The following direction is specific to hydrology and water resources. Present the mitigation measures associated with the project alternatives within each geographic segment under the subheadings of Construction Measures and Operations Measures. Organizing impacts by these two general periods of project implementation will help explain when impacts are expected to occur. The heading structure for this organizational scheme is shown in Section 3.8.11.

Develop project-level measures that are consistent with adopted program and project strategies that avoid or minimize impacts. Begin by considering programmatic mitigation strategies described in Section 3.0.7 and the hydrology and water resources-related technical reports and environmental document sections in the most recent environmental documents produced by the Authority (e.g., *Fresno to Bakersfield Section Final EIR/EIS*, or more recent HSR project EIR/EIS), as applicable to the HSR project section.

Refine general mitigation strategies into project-level, project-specific mitigation measures that are coupled to project-specific impacts. Design specific mitigation measures to address any significant hydrology and water resources effects. If specific mitigation measures cannot be formulated with precision (i.e., the precise measure(s) in a precise location with precise features), then identify quantifiable performance standards. At a minimum, include quantitative, qualitative, and location criteria performance standards to ensure the mitigation measures can be implemented and effectively reduce the impact to a less-than-significant level. Deferred mitigation measures are only acceptable where there are measureable performance criteria, there is a specified time or action trigger for performance, and the Authority commits to implementing them. For example, an unspecified erosion control measure that achieves a measureable level of sediment control would need to be in place prior to the commencement of construction. In the instance where mitigation measures would be implemented by another entity, such as a local jurisdiction or other agency that is not within the purview of the Authority, implementation cannot be guaranteed and the impact would therefore remain significant and unavoidable.

Draft mitigation measures to facilitate transition into the Mitigation Monitoring and Enforcement Plan by clearly identifying responsibility and timing for implementation, as appropriate. For example, the project will implement enhanced stormwater management and stormwater treatment, beyond standard BMPs included in the avoidance and minimization features, by detaining all stormwater and entrained sediment released from the HSR segment during construction in a constructed basin adjacent to the project. Detention basins avoid discharges to off-site waters by capturing runoff and disposing of water through ground percolation and evaporation. The detention basin will be designed as a part of final project design. The detention basin will be installed as part of the HSR project but before starting other ground disturbance associated with HSR improvements in the segment.

3.8.8 Impacts from Implementing Mitigation Measures

General guidance for constructing the discussion of impacts from implementing mitigation measures is provided in Section 3.0.8, Impacts from Implementing Mitigation Measures.

Mitigation measures can cause both positive and negative impacts that must be disclosed and considered as part of the environmental analysis. For example, *constructing a stormwater detention basin could require the storage of sidecast soil in a construction area that would be under construction over a relatively long construction season. Stockpiled soil increases the potential for PM_{10} and $PM_{2.5}$ emissions to exceed the State Air Quality Standards from fugitive dust. Exceeding the State Air Quality Standards would be a significant impact. The following*

avoidance and minimization feature would apply to the soil stockpiled from the stormwater detention basin excavation: following the addition of materials to, or the removal of materials from, the surface of outdoor storage piles, piles will be effectively stabilized for fugitive dust emissions using sufficient water or a chemical stabilizer/suppressant. Even with implementation of this avoidance and minimization feature, the stockpiled soil, when combined with all of the construction activities expected to occur simultaneously, would not reduce the probability that the state's PM_{10} and $PM_{2.5}$ emissions thresholds would be exceeded. The Authority has committed to entering into a Voluntary Emissions Reduction Agreement with the air pollution control district (AQ-MM #5). The funds provide for the agreement would reduce the fugitive dust and emissions to the extent that the PM_{10} and $PM_{2.5}$ emissions for the stockpiled soil from the detention basin would be off-set. Therefore, by implementing AQ-MM #5, the potential impacts from PM_{10} and $PM_{2.5}$ emissions would be less than significant.

Evaluate all mitigation measures, including off-site measures, using the methods in Section 0. Determine probable impacts using actual, on-the-ground analysis and describe the substantial basis for analytical conclusions (including defined thresholds or other criteria). When the impacts of mitigation measures cannot be quantified (e.g., at a specific location, in a definite extent, at a particular time or duration, or measurable alteration of the affected resource), evaluate potential impacts using clearly described assumptions based upon reasonably foreseeable outcomes. For brevity, the Volume 1 EIR/EIS subsection can provide a summary explanation when the details of analyses and conclusions are documented in a Volume 2 technical appendix (covering all potential impacts from implementing mitigation measures).

3.8.9 Impacts Summary

3.8.9.1 NEPA Impacts

The overall structure and content of this discussion is presented in Section 3.0.9.1, NEPA Impacts. The heading structure for this organizational scheme is shown in Section 3.8.11 of this methodology. Use maps, as appropriate, to show locations of significant impacts of alternatives by segment.

3.8.9.2 CEQA Significance Conclusions

The overall structure and content of this discussion is presented in Section 3.0.9.2, CEQA Significance Conclusions. The heading structure for this organizational scheme is shown in Section 3.8.11. Use maps, as appropriate, to show locations of significant unavoidable impacts of alternatives by segment.

3.8.10 Products

The RC is responsible for preparing the following products, under Authority and FRA direction, according to PMT guidance and subject to PMT quality control and assurance.

3.8.10.1 Technical Report or Appendix

In addition to the Volume 1 impacts analysis chapter, provide technical reports and Volume 2 appendices where full analysis applicable to the HSR project section requires details in excess of efficient inclusion in the EIR/EIS Volume 1 chapter. For example:

1. Volume 2, Appendix 2-E, Project Impact Avoidance and Minimization Features Analysis
2. Volume 2, Appendix 3.1-B, Regional and Local Policy Inventory
3. Volume 2, Appendix 3.8-A, Water Bodies Crossed by (Applicable Section Name) Section Alternatives
4. Volume 2, Appendix 3.8-B, Floodplain Risk Assessment, if applicable, by (Applicable Section Name) Section Alternatives

5. Volume 2, Appendix 3.8-C, Beneficial Uses Impact Assessment
6. Hydrology and Water Quality Technical Report
7. Floodplain Risk Assessment

3.8.10.2 Project EIR/EIS Volume 1

1. Summary/table for EIR/EIS Executive Summary
2. Project Description—Hydrology and Water Resources-related Components (as applicable to HSR project section):
    a. Impact Avoidance and Minimization Features
    b. Summary Table of Impact Avoidance and Minimization Features, and Project Impacts
3. Affected Environment, Environmental Consequences and Mitigation Measures Section: Hydrology and Water Resources
4. Affected Environment, Environmental Consequences and Mitigation Measures Section: Cumulative Impacts

3.8.11 Hydrology and Water Resources EIR/EIS Outline

The RC will use the following outline for organizing content related to the hydrology and water resources in Chapter 3 of the project EIR/EIS, using the heading hierarchy and format as indicated. The RC shall consider the impacts of implementing mitigation measures in Section 3.8.7.

3.8 Hydrology and Water Resources
- 3.8.1 Introduction
- 3.8.2 Laws, Regulations, and Orders
    - 3.8.2.1 Federal
    - 3.8.2.2 State
    - 3.8.2.3 Regional and Local
- 3.8.3 Regional and Local Policy Analysis
- 3.8.4 Methods for Evaluating Impacts
    - 3.8.4.1 Definition of Resource Study Area
    - 3.8.4.2 Method for Determining Significance under NEPA
    - 3.8.4.3 Method for Determining Significance under CEQA
- 3.8.5 Affected Environment
    - 3.8.5.1 Project Segment 1
        - Alternative 1
        - Alternative 2
        - Alternative 3
        - Alternative N
    - 3.8.5.2 Project Segment 2
        - Alternative 1
        - Alternative 2
        - Alternative 3
        - Alternative N
    - 3.8.5.3 Project Segment 3
        - Alternative 1
        - Alternative 2
        - Alternative 3
        - Alternative N

3.8.5.4 Project Segment N
- Alternative 1
- Alternative 2
- Alternative 3
- Alternative N

3.8.6 Environmental Consequences

3.8.6.1 Overview

3.8.6.2 Project Segment 1
- No Project
- Alternative 1
  - Construction Impacts
  - Operations Impacts
- Alternative 2
  - Construction Impacts
  - Operations Impacts
- Alternative 3
  - Construction Impacts
  - Operations Impacts
- Alternative N
  - Construction Impacts
  - Operations Impacts

3.8.6.3 Project Segment 2
- No Project
- Alternative 1
  - Construction Impacts
  - Operations Impacts
- Alternative 2
  - Construction Impacts
  - Operations Impacts
- Alternative 3
  - Construction Impacts
  - Operations Impacts
- Alternative N
  - Construction Impacts
  - Operations Impacts

3.8.6.4 Project Segment 3
- No Project
- Alternative 1
  - Construction Impacts
  - Operations Impacts
- Alternative 2
  - Construction Impacts
  - Operations Impacts
- Alternative 3
  - Construction Impacts
  - Operations Impacts
- Alternative N
  - Construction Impacts
  - Operations Impacts

3.8.6.5 Project Segment N
- No Project
- Alternative 1
  - Construction Impacts
  - Operations Impacts
- Alternative 2
  - Construction Impacts
  - Operations Impacts
- Alternative 3
  - Construction Impacts
  - Operations Impacts
- Alternative N
  - Construction Impacts
  - Operations Impacts

3.8.7 Mitigation Measures

3.8.7.1 Project Segment 1
- Alternative 1
  - Construction Measures
  - Operations Measures
- Alternative 2
  - Construction Measures
  - Operations Measures
- Alternative 3
  - Construction Measures
  - Operations Measures
- Alternative N
  - Construction Measures
  - Operations Measures

3.8.7.2 Project Segment 2
- Alternative 1
  - Construction Measures
  - Operations Measures
- Alternative 2
  - Construction Measures
  - Operations Measures
- Alternative 3
  - Construction Measures
  - Operations Measures
- Alternative N
  - Construction Measures
  - Operations Measures

3.8.7.3 Project Segment 3
- Alternative 1
  - Construction Measures
  - Operations Measures
- Alternative 2
  - Construction Measures
  - Operations Measures
- Alternative 3
  - Construction Measures
  - Operations Measures

Alternative N
Construction Measures
Operations Measures
3.8.7.4 Project Segment N
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.8.8 NEPA Impact Summary
3.8.8.1 Alternative 1
Construction Impacts
Operations Impacts
3.8.8.2 Alternative 2
Construction Impacts
Operations Impacts
3.8.8.3 Alternative 3
Construction Impacts
Operations Impacts
3.8.8.4 Alternative N
Construction Impacts
Operations Impacts
3.8.9 CEQA Significance Conclusions
3.8.9.1 Alternative 1
Construction Impacts
Operations Impacts
3.8.9.2 Alternative 2
Construction Impacts
Operations Impacts
3.8.9.3 Alternative 3
Construction Impacts
Operations Impacts
3.8.9.4 Alternative N
Construction Impacts
Operations Impacts

3.9 Geology, Soils, Seismicity, and Paleontological Resources

The methodology guidelines in this section are organized by a sequence of steps for preparing an environmental document. Section 3.9.11 provides an outline for this environmental impact report/environmental impact statement (EIR/EIS).

Section 3.0, General Methodology Guidance for Resource Sections, provides the methodological framework common to the evaluation of all resource areas. Section 3.19, Cumulative Impacts, provides the cumulative impact analysis methodology. Use Section 3.0 and Section 3.19 in combination with this Geology, Soils, Seismicity, and Paleontological Resources (GSSPR) guidance section when developing the EIR/EIS analyses.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the resource section. Example text that illustrates the concepts and methods is shown in *italics*. The methods are organized to mirror the organization of the EIR/EIS section or chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

If there is a discrepancy between the material in this guidance and any adopted federal and state agency guideline or manual applicable to GSSPR, the agency guideline or manual controls. Identify and discuss any such discrepancy with the California High-Speed Rail Authority (Authority), Federal Railroad Administration (FRA), and the Program Management Team (PMT) before deviating from this guidance.

3.9.1 Introduction

The general method for preparing an introduction for this resource section is provided in Section 3.0.1, Introduction. The following discussion presents direction specific to Geology, Soils, Seismicity, and Paleontological Resources.

Refer specifically to related content in other sections of the EIR/EIS that influence or are influenced by the GSSPR impact analysis (for the geology, soils, seismicity section, these sections include biological resources and wetlands, which discusses the presence of hydric soils; hydrology and water, which discusses hydrogeology and the proximity of water resources that can influence geologic resources; hazardous materials and wastes, which discusses subsurface conditions related to the fate and transport of contaminants; and safety and security, which addresses earthquake safety of the project) and supportive/associated technical documents. References to other documents must include citation to specific sections (by lowest heading tier, e.g., 3.X.X), not just a general reference to a chapter in the EIR/EIS.

3.9.2 Laws, Regulations, and Orders

Federal, state and local laws, regulations, orders or plans germane to GSSPR affected by the project are presented below. General National Environmental Policy Act (NEPA) and California Environmental Policy Act (CEQA) requirements for assessment and disclosure of environmental impacts are described in Section 3.1 Introduction and are therefore not restated in the resource section of the chapter.

3.9.2.1 Federal

Procedures for Considering Environmental Impacts (64 Fed. Reg. 28545)

These Federal Railroad Administration (FRA) procedures state that an EIS should consider possible impacts on energy and mineral resources.

American Antiquities Act of 1906 (16 U.S.C. § 431–433)

The American Antiquities Act was enacted with the primary goal of protecting cultural resources in the U.S. As such, it prohibits appropriation, excavation, injury, or destruction of "any historic or prehistoric ruin or monument, or any object of antiquity" located on lands owned or controlled by the federal government. The act also establishes penalties for such actions and sets forth a permit requirement for collection of antiquities on federally owned lands.

Neither the American Antiquities Act itself nor its implementing regulations (43 C.F.R. Part 3) specifically mentions paleontological resources. However, many federal agencies have interpreted objects of antiquity as including fossils. Consequently, the American Antiquities Act represents an early cornerstone for efforts to protect the nation's paleontological resources.

Paleontological Resources Preservation Act (16 U.S.C. § 470aaa)

Enacted as part of the Omnibus Public Land Management Act (2009), the Paleontological Resources Preservation Act (PRPA) requires the Secretaries of the Interior and Agriculture to manage and protect paleontological resources on federal land using scientific principles and expertise. The PRPA includes specific provisions addressing management of these resources by the Bureau of Land Management, the National Park Service, the Bureau of Reclamation, the U.S. Fish and Wildlife Service, and the U.S. Forest Service of the Department of Agriculture. The PRPA affirms the authority for many of the policies the federal land managing agencies already have in place for the management of paleontological resources, such as issuing permits for collecting paleontological resources, curation of paleontological resources, and confidentiality of locality data.[1]

3.9.2.2 State

Alquist-Priolo Earthquake Fault Zoning Act (Cal. Public Res. Code, § 2621 et seq.)

This act provides policies and criteria to assist cities, counties, and state agencies in the exercise of their responsibilities to prohibit the location of developments and structures for human occupancy across the trace of active faults. The act also requires site-specific studies by licensed professionals for some types of proposed construction within delineated earthquake fault zones.

Seismic Hazards Mapping Act (Cal. Public Res. Code, §§ 2690–2699.6)

This act requires that site-specific hazards investigations be conducted by licensed professionals within the zones of required investigation to identify and evaluate seismic hazards and formulate mitigation measures prior to permitting most developments designed for human occupancy.

Surface Mining and Reclamation Act (Cal. Public Res. Code, § 2710 et seq.)

This act addresses the need for a continuing supply of mineral resources and is intended to prevent or minimize the adverse impacts of surface mining on public health, property, and the environment. The act also assigns specific responsibilities to local jurisdictions in permitting and oversight of mineral resources extraction activities.

California Building Standards Code (Cal. Public Res. Code, tit. 24)

The California Building Standards Code (CBC) governs the design and construction of buildings, associated facilities, and equipment and applies to buildings in California.

Oil and Gas Conservation (Cal. Public Res. Code, §§ 3000–3473)

The Division of Oil Gas and Geothermal Resources (DOGGR) within the Department of Conservation oversees the drilling, operation, maintenance, and plugging and abandonment of oil,

[1] U.S. Department of the Interior, Bureau of Land Management, Heritage Resources. Internet page entitled *Laws & Policy*, at www.blm.gov/wo/st/en/prog/more/CRM/paleontology/paleontological_regulations.print.html on 8/14/13.

natural gas, and geothermal wells. DOGGR's regulatory program emphasizes the wise development of oil, natural gas, and geothermal resources in the state through sound engineering practices that protect the environment, prevent pollution, and ensure public safety.

California Environmental Quality Act (Cal. Public Res. Code, § 21000 et seq.) and CEQA Guidelines Protection for Paleontological Resources

The CEQA statute includes "objects of historic … significance" in its definition of the environment (CEQA § 21060.5), and Section 15064.5 of the State CEQA Guidelines further defines historical resources as including "any object…site, area, [or] place… that has yielded, or may be likely to yield, information important in prehistory." This has been widely interpreted as extending CEQA consideration to paleontological resources, although neither the CEQA statute nor the Guidelines provide explicit direction regarding the treatment of paleontological resources.

California Public Resources Code

The California Public Resources Code (PRC) also protects paleontological resources in specific contexts. In particular, PRC Section 5097.5 prohibits "knowing and willful" excavation, removal, destruction, injury, and defacement of any paleontological feature on public lands without express authorization from the agency with jurisdiction. Violation of this prohibition is a misdemeanor and is subject to fine and/or imprisonment (PRC § 5097.5(c)), and persons convicted of such a violation may also be required to provide restitution (PRC § 5097.5(d)(1)). Additionally, PRC Section 30244 requires "reasonable mitigation measures" to address impacts on paleontological resources identified by the State Historic Preservation Officer.

California Administrative Code (Cal. Code Regs., tit. 14, §§ 4307–4309)

The sections of the California Administrative Code relating to the State Division of Beaches and Parks afford protection to geologic features and "paleontological materials" but also assign the director of the state park system the authority to issue permits for activities that may result in damage to such resources, if the activities are for state park purposes and are in the interest of the state park system.

3.9.2.3 Regional and Local

Compile a complete inventory of adopted local and regional plans, ordinances, or guidelines related to GSSPR. A tabular format similar to that used in the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014), or more recent HSR project EIR/EIS, may be used to organize and concisely report this information. This information will become part of Volume 2 Appendix 3.1-B Regional and Local Policy Inventory.

County or Municipal General Plans

Geology-related policies as a basis for land use planning decisions, including geologic hazards policies, paleontological resource conservation, etc.

Local Jurisdiction Ordinances and Codes

- Geology-related regulations as a basis for land use or infrastructure planning decisions, including geologic or seismic hazard regulations, hillside ordinances, etc.
- Grading ordinances
- Paleontological, cultural, or "heritage resources" preservation ordinances

3.9.3 Regional and Local Policy Analysis

The overall structure of this discussion is presented in Section 3.0.3, Regional and Local Policy Analysis. As described in more detail in subsection 3.0.3.2, this analysis will describe any

inconsistency or conflict with adopted regional or local policies and implementation of the HSR project.

3.9.4 Methods for Evaluating Impacts

Evaluation of impacts related to geology, soils, and seismicity is a requirement of CEQA and NEPA.

To establish the baseline for analysis (CEQA existing conditions/NEPA affected environment), describe existing geologic conditions (e.g., geologic setting, faults, mineral resources, fossil fuel/energy resources etc.) and risks (e.g., primary and secondary seismic hazards, unstable slopes, etc.) relevant to the corridor based on information available from published maps, professional publications, and reports pertaining to the geology, soils and seismicity of the project vicinity, which are typically available from the U.S. Geological Survey (USGS), California Geological Survey (CGS) and other governmental agencies. In addition, contact the USGS, CGS and industry groups for additional information on these resources.

As part of the baseline for analysis, discuss known and potential paleontological resources (paleontological potential, paleontological sensitivity) consistent with the resource evaluation approach laid out in California Department of Transportation (Caltrans) *Standard Environmental Reference* (SER), Chapter 8. As of February 2014, this document is available online at: www.dot.ca.gov/ser/vol1/sec3/physical/Ch08Paleo/chap08paleo.htm. While the SER document provides the reference for resource evaluation, impact analysis, and mitigation in project-level documents under the HSR program, the multi-tiered Caltrans report hierarchy is replaced with a single project-specific technical report. The technical report is to combine the information presented in the Caltrans SER Paleontological Identification Report (PIR) and Paleontological Evaluation Report (PER) and is to be consistent with the requirements for those two reports as laid out in the current SER Chapter 8. If the project has the potential for significant impacts on paleontological resources, describe an appropriate mitigation approach in the technical report, consistent with guidance of the recommendations of the Society of Vertebrate Paleontology (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995) and California Department of Transportation (2012) (see Section 3.9.7 for more information on acceptable mitigation approaches).[2]

Data resources for the evaluation of paleontological potential will typically include the published geologic and paleontological literature, museum and university collections databases, unpublished masters theses and PhD dissertations, environmental documents and technical studies for other projects in the area, and conversations with subject matter experts specializing in the types of fossil resources likely to occur in the area. Key university and museum collections are identified in Table 3.9-18.

If applicable, include information on prior and on-going efforts to avoid unique or commercially important geologic, mineral, and fossil fuel resources and scientifically important paleontological resources, including reference to impact avoidance and minimization features described in Section 2.5.2, HSR Build Alternatives.

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[2] The Caltrans SER report hierarchy also provides for a separate Paleontological Mitigation Plan (PMP) document prepared in the event the PER identifies the potential for significant impacts on paleontological resources. The contents of the PMP are laid out in SER Chapter 8. In some cases, it may be possible and appropriate to include all of the information required in a PMP in the project-level paleontological resources technical report. However, depending on a number of factors, including but not necessarily limited to the nature of the potential impacts, the types of fossil resources involved (and the type of institution and of receivership agreements needed for appropriate curation), and the availability of access to private property for on-the-ground reconnaissance at the time the paleontological resources technical report is prepared, it may be necessary to defer some or all of the detail typically included in the PMP. If this is the case, the mitigation included in the technical report shall include preparation by appropriately qualified professional staff of a complete PMP consistent with the current SER requirements and the Conditions for Receivership described by the Society of Vertebrate Paleontology (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1996). These requirements shall be incorporated or referenced as performance standards for the PMP.

The following paragraphs describe the methods for developing the resource study area (RSA) and for evaluating effects under CEQA and NEPA. Subsequent sections provide direction for the design of mitigation measures and the structure for presenting content related to GSSPR in project-level EIR/EIS documents.

3.9.4.1 Definition of Resource Study Area

The RSA is the area in which all environmental investigations specific to GSSPR are conducted to determine the resource characteristics and potential impacts of the project segment. The overall contextual factors defining the RSA and the description of the elements comprising the RSA are provided in the General Methodology Guidance.

The boundaries of the RSA for all resource topics included in GSSPR extend beyond the project footprint and also extend into the subsurface beneath the project alignment. Although geologic mapping (a two-dimensional representation) is a primary tool in assessing the existing conditions baseline for GSSPR, these are fundamentally three-dimensional resources and hazards that require the ability to read and interpret geologic mapping. If available, project-specific geotechnical investigations may also provide information helpful in developing the baseline for GSSPR analysis. The extent of geotechnical data may be limited by constrained access to private properties and the requirements for developing preliminary design for EIR/EIS analyses.

The concept of the RSA is applied slightly differently for geology, soils, and seismicity impacts than for paleontological resources impacts. The basis for defining the two types of GSSPR RSAs, and the differences between them, are explained further in the sections below. A table summarizing RSA considerations for all GSSPR resource topics follows the resource-specific discussions.

The RSA for cumulative effects may be a broader area depending on the project section and will consider adjacent HSR project sections to ensure a broad consideration of impacts on a more regional and statewide basis. See Section 3.19, Methodology for Cumulative Impacts, for a more detailed discussion.

Geology, Soils, and Seismicity

The geology, soils, and seismicity portion of the GSSPR impact analysis addresses both the effects of the project on geologic resources and the effects of geologic conditions and hazards on project design, construction, and operation.

The resource study area for geology, soils, and seismicity shall be defined as the project footprint plus a 150-foot buffer for all resources and conditions with the following resources or conditions having larger resource study areas:

- Resource hazards, such as soil failures (e.g., adequacy of load-bearing soils), settlement, corrosivity, shrink-swell, erosion, earthquake-induced liquefaction risks, subsidence, and subsurface has hazards, shall have a resource study area of the project footprint plus a 0.5-mile buffer along the project alignment with the buffer increasing to 2 miles around maintenance sites and station sites. These radii should be applied for subsurface gas hazards, mineral resources, and oil and natural gas resources.
- The seismicity resource study area shall include the regional extent of earthquake faults or dam failure inundation areas, identified in terms of distance in miles from the project features.

The RSAs described above are considered reasonable to identify resources and conditions relevant to project-specific analysis; however, expand or reconfigure the RSA(s) as warranted by resource conditions and the potential extent of effects of the HSR project within or beyond the HSR section limits.

Paleontological Resources

For paleontological resources, the concept of the RSA is best understood as a Study Volume encompassing all of the geologic units affected by project ground disturbance, throughout the entirety of their (three-dimensional) geographic extent. The RSA for paleontological resources shall be defined as the project footprint plus a 150-foot buffer plus the vertical dimension to include all geologic units below the horizontal RSA which project construction or operation may encounter. The depth of the vertical dimension will vary regionally based primarily on project construction techniques. However, apply a conservative approach where needed to provide sufficient information to evaluate adjustments in construction techniques or extents.

Consideration of the vertical dimension is required, in part, because the principal mechanism for impacts on paleontological resources is disturbance and loss of fossil materials as a result of ground-disturbing activities. Where ground disturbance extends into the subsurface, as is typical for excavation, grading, tunneling, or foundation drilling, the impact area (surface disturbance) becomes an impact volume (three dimensional extent of disturbance).

In addition, the current prevailing professional practice considers geologic units that have produced fossil finds in the past will likely do so again. Such units are considered sensitive for paleontological resources and the level of paleontological sensitivity or paleontological potential applies throughout the (three-dimensional) extent of the unit. This is sometimes described as the concept of "sensitive anywhere, sensitive everywhere." By the same token, geologic units that have not produced past fossil finds are generally considered less sensitive throughout the region of the unit. In this context, the evaluation of paleontological potential—and by extension, of the potential for impacts on fossil resources—depends not on fossil finds within a certain distance of the project footprint, but rather on fossil finds in the geologic units affected by the project, wherever those units occur.

Accordingly, the critical steps in developing the baseline for paleontological resources impact analysis are:

- Identifying the geologic units within the RSA—this includes the geologic units that are exposed at the surface, as well as the deeper, underlying strata that may be encountered by excavation, tunneling, etc.
- Evaluating the potential of the affected geologic units to contain scientifically important fossil resources (described as their paleontological potential or sensitivity (see below for additional guidance on paleontological potential evaluation)

To identify the surface-exposed geologic units affected by the project, the RSA is first overlaid on geologic mapping for the project corridor. This may be done manually in hard copy, but will typically be most efficient in GIS, particularly if multiple generations of geologic mapping provide different interpretations that must be considered and reconciled. To identify affected geologic units in the subsurface, the RSA is then extended into the third dimension based on the anticipated maximum depth of disturbance for the various project elements.

As with other GSSPR topics, the identification of potentially affected geologic units requires the ability to read and interpret geologic mapping in three dimensions and may also involve other specialized skills, such as the construction of geologic cross sections or interpretation of geotechnical boring logs. For this reason, the identification of affected geologic units should typically be performed or peer reviewed by qualified staff (California-licensed Professional Geologist or equivalent qualification). In most cases, this phase of the evaluation process would be completed during the preparation of the paleontological resources technical report, but it is important for CEQA/NEPA analysts to understand the process because of the potential need to work with qualified staff in adjusting the RSA/Study Volume as project design evolves.

Overview of RSA Considerations for All GSSPR Topics

Table 3.9-1 summarizes the physical and operational elements of the RSAs for all GSSPR resource topics discussed in more detail in the preceding text. Table 3.9-1 also identifies relevant information sources and baseline metrics to help define the RSA and identify potentially relevant hazards and resources.

3.9.4.2 Methodology for Impact Analysis

Group and consolidate information and discussion to effectively present content to the lay audience (i.e., by distinct resource characteristic or component, geology, soils, geologic hazards, seismic hazards, mineral and energy resources, and paleontology within segments defined in Chapter 2). Include detailed information on geologic setting, including geohazards and mineral and fossil fuel resources as a technical appendix in Volume 2 of the EIR/EIS. Describe project-specific paleontological resources in another technical report appendix in Volume 2. Provide specific reference to the technical appendices in the GSSPR resources section of Chapter 3 to help the reader navigate between volumes.

The following sections provide additional information and guidance specific to the various GSSPR resource topics, followed by an overview of GSSPR impact types and mechanisms.

Geology, Soils, and Seismicity

Analyze direct and indirect impacts related to geology, soils, seismicity, and mineral and fossil fuel resources through quantitative analysis and, where necessary, with qualitative analysis. Analyze impacts which may occur during construction and operation of the HSR system (note: the analytical results for construction impacts and operations impacts are presented separately in the EIR/EIS). Apply the same impact thresholds in both project timeframes. The judgment of appropriately licensed professionals should be employed when considering the context and intensity of an effect to determine the significance of impacts. Consider relevant aspects of context (e.g., existing resource conditions, resource sensitivity) and appropriate factors of intensity (e.g., extent of change, duration of change) for determining impact significance. Also consider project actions that improve or otherwise benefit resource values in the evaluation of impact significance.

Begin the analysis with consideration of the impact avoidance and minimization features that are incorporated into the project in Section 2.5.2, HSR Build Alternatives, and evaluated in Volume 2, Appendix 2-E. Account for implementation of design features or best management practices, such as compliance with established engineering and technical standards of federal and state agencies and private organizations (AASHTO/AREMA) that are intended to minimize or avoid the types of impacts being evaluated in this chapter. Refer to the summary table of impact avoidance and minimization features and explain how particular design features avoid impacts or ensure they are less-than-significant impacts to GSSPR.

Base the analysis on a review of available reports and data (including federal and state statutes, resource agency, local, and regional agency policies and ordinances), discussions with agency representatives in the region, field investigation (where applicable and enabled by property access), modeling (where applicable), and professional judgment. Some types of localized information will not be in published reports and may be obtainable only by conferring with local agency representatives and subject matter experts. Develop GIS databases for each project segment. Develop GIS data (a) as part of project design or (b) from available federal, state, and local sources. Provide sufficient detail to allow complete analysis of the anticipated design of the completed project or of reasonable assumptions for project implementation, including but not necessarily limited to surficial geology, soil types/associations, faults, historic earthquakes, peak ground acceleration, inundation areas due to dam failure, and oil, gas, and geothermal fields, etc. Focus analysis on the project’s potential to alter existing conditions of the affected resources

Table 3.9-1 Resource Study Area Information

Required Information	Resource Study Area
▪ Conceptual engineering plans and profiles ▪ Project description ▪ USGS topographic maps ▪ USGS and CGS geologic and landslide maps ▪ Natural Resources Conservation Service (NRCS) soils maps ▪ CGS Seismic Hazard Zone maps ▪ CGS Alquist-Priolo Earthquake Fault Zone maps ▪ USGS and additional CGS active fault maps ▪ USGS and CGS ground-shaking maps ▪ Northern California Earthquake Data Center website (www.ncedc.org) ▪ Southern California Earthquake Data Center website (www.scec.org), particularly the fault maps at www.data.scec.org ▪ California Emergency Management Agency's dam inundation hazard zone maps ▪ USGS and State of California mineral commodity producer databases ▪ State of California Mineral Resource Zone (MRZ) mapping ▪ Online databases for mineral resources, fossil fuels and geothermal resources published by DOGGR ▪ Published geologic and paleontological literature ▪ Museum and university paleontological collections databases ▪ Relevant masters' theses and PhD dissertations ▪ Environmental documents and technical studies for other projects in the area ▪ Input from subject matter experts specializing in the types of fossil resources likely to occur in the area	▪ Potential area of disturbance associated with the construction of the project includes the proposed HSR alignments and associated facilities, as well as the roadway changes necessary to accommodate the HSR alignments and temporary construction laydown areas. ▪ The RSA for the *Geology, Soils, and Seismicity* technical report considers many elements related to the geology and soil. The RSA for each is described briefly below: – Topography • Regional setting: geomorphic province level • More detailed information along project alignment – Geology • Regional setting: geomorphic province/2-degree sheet scale • More detailed information along project's alignment – Soils—Project alignment – Geologic hazards and seismic hazards, such as soil failures (e.g., adequacy of load-bearing soils), settlement, corrosivity, shrink-swell, erosion, and earthquake-induced liquefaction risks—Study area is up to 150 feet on either side of the project alternative footprints – Landslide hazards—Areas at risk within and adjacent to project alignment – Surface fault rupture—Faults intersecting with and adjacent to project alignment – Ground shaking—All faults sufficiently close to pose strong ground shaking risk, depending on fault Maximum Considered Earthquake (MCE), substrate, and modeled peak ground acceleration (PGA) at site – Liquefaction, other ground failure, seismically induced landslides—Hazard zones within and adjacent to project alignment – Tsunami, seiche, dam failure inundation—Features located such that they pose a risk to alignment (the distance will vary depending on type of hazard, topography, etc.) – Subsurface gas hazard • 0.5-mile radius around proposed project alignments, stations, and maintenance facilities • 2-mile radius around proposed Heavy Maintenance Facility (HMF) sites and stations – Mineral resources • 0.5-mile radius around proposed project alignments • 2-mile radius around proposed HMF sites and stations – Oil and natural gas resources • 0.5-mile radius around proposed project alignments • 2-mile radius around proposed HMF sites and stations ▪ Paleontological Resources—Includes all of the geologic units within the project footprint plus a 150 foot buffer to a depth sufficient to capture all the geologic units potentially encountered by project construction and operation (see additional discussion in text above) ▪ The general RSA around project features are as follows: – At-grade sections—150-foot radius around proposed project right-of-way – Tunnel and cut-and-cover sections—200-foot radius around proposed project right-of-way – Cut and fill sections—150–foot radius around proposed project right-of-way – Aerial sections—150-foot radius around proposed project right-of-way

in the RSA(s). Identify where permit applications will be needed and provide analysis to support future permit review.

Geotechnical investigations to support preliminary HSR design for the Draft EIR/EIS must include the following steps:

- Gather and evaluate available geotechnical information
- To supplement available geotechnical information, confer with HSR section designers to determine needs for additional survey data and prospective locations for field survey
- Initiate permission to enter process to obtain access to geotechnical boring locations
- Conduct in-field assessment of locations to confirm avoidance of all impacts, using cultural resources and biological and wetlands expertise
- Prepare Environmental Assessment/Finding of No Significant Impact and Initial Study/ Mitigated Negative Declaration or Categorical Exemption/Exclusion to support drilling activities and submit documentation to the Authority and FRA for review, comment, and approval
- Obtain drilling permits and permission to enter approvals as needed and accepted by the Authority and FRA
- Conduct the geotechnical boring, evaluate drilling samples using laboratory analysis, and dispose of boring spoils and samples following established industry practice
- Prepare a written report documenting the methodology, investigative work, data and analysis conclusions and submit to the Authority for review and comment

Paleontological Resources

Paleontological resources impact analysis will typically be drawn from, and will closely reflect the conclusions of, the project-specific paleontological resources technical report. As noted above, paleontological resources technical reports should adhere to the resource evaluation approach and content requirements presented in Caltrans SER Chapter 8 (Caltrans 2012). The project-specific technical report will combine the functions of the Caltrans SER PIR and PER and be consistent with the format and content requirements in the SER Chapter 8 for both of those reports. Paleontological resources evaluation and impact analysis should be conducted by appropriately qualified and experienced staff; this is not a "generalist" discipline. Consultation with outside subject matter experts is also strongly recommended, particularly if paleontological potential (sensitivity) is uncertain.

Many fossil materials are buried in subsurface geologic units rather than exposed at the ground surface. In many cases, a lead agency cannot be certain whether fossil resources will actually be encountered until project earthwork has occurred. Paleontological resource impact analysis are therefore based on probabilities of impact, with the goal of developing flexible strategies to support appropriate adaptive management in response to information that may "come to light" during project construction. The current standard of approach to paleontological resources impact analysis is represented by the Caltrans SER approach as well as the guidelines of the Society of Vertebrate Paleontology (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995). This approach uses a stepwise process that first assesses the likelihood that the RSA contains significant fossil resources and then formulates a mitigation approach based on the identified level of risk to those resources that results from project-related activities. A crucial working assumption in this approach is that a geologic unit that has produced fossil finds in the past is likely to do so again and in other locations (i.e., the same paleontological potential is considered to apply throughout the three-dimensional extent of the unit—everywhere that unit occurs—regardless of whether fossils have been found in a given location or not).

There are four steps in analyzing a project's potential to impact paleontological resources:

1. Identify the geologic units in the RSA—as discussed in Section 3.9.4.1, this includes both surface-exposed units and those subsurface that may be encountered by excavation, tunneling, foundation drilling, etc.
2. Evaluate the potential of identified geologic units to contain significant fossils (their paleontological potential or paleontological sensitivity).
3. Assess the nature and extent of impacts from project construction and operation. All ground-disturbing project activities are to be considered, including but not necessarily limited to site preparation, excavation, grading, tunneling, and foundation drilling.
4. Evaluate impact significance.

Impact significance typically reflects damage or loss of significant fossils, and the significance of fossil materials roughly equates to their scientific importance. For purposes of project-level documents, the HSR program defines *significant* fossils as those that provide taxonomic, taphonomic, phylogenetic, stratigraphic, ecologic, or climatic information. Significant fossils may include body fossils, traces, tracks, and trackways. In California, vertebrate fossils of all types and sizes are typically considered significant because of their comparative rarity and their informational potential. Invertebrate fossils, plant fossils, and microfossils may also be scientifically important and therefore significant. This definition is consistent with both the Caltrans SER approach and with the very similar protocols of the Society of Vertebrate Paleontology (Society of Vertebrate Paleontology 1995), which represent another widely accepted discipline standard.

The paleontological potential (or sensitivity) of geologic units reflects their potential to contain significant resources, and is evaluated as summarized in Table 3.9-2.

Table 3.9-2 Evaluation of Paleontological Sensitivity/Paleontological Potential

Rating	Description
High Potential (high sensitivity)	▪ Includes rock units that, based on previous studies, are known or likely to contain significant vertebrate, invertebrate, or plant fossils, including but not limited to sedimentary formations that contain significant nonrenewable paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. May include some volcanic and low-grade metamorphic rock units. Fossiliferous deposits with very limited geographic extent or an uncommon origin (e.g., tar pits and caves) are given special consideration. ▪ *High sensitivity* reflects the potential to contain (1) abundant vertebrate fossils; (2) a few significant vertebrate, invertebrate, or plant fossils that may provide new and significant taxonomic, phylogenetic, ecologic, and stratigraphic data. It also encompasses areas that may contain datable organic remains older than recent, including packrat or woodrat (*Neotoma* sp.) middens and areas that may contain unique new vertebrate deposits, traces, and trackways.
Low Potential (low sensitivity)	▪ Includes sedimentary rock units that (1) are potentially fossiliferous but have not yielded significant fossils in the past; (2) have not yielded fossils but have the potential to do so; or (3) contain common or widespread invertebrate fossils whose taxonomy, phylogeny, and ecology are well understood. Sedimentary rocks expected to contain vertebrate fossils are not placed in this category because vertebrate fossils are typically rare and occur in more localized deposits.
No Potential (not sensitive)	▪ Includes rock units considered to have no potential to contain significant paleontological resources, such as rocks of intrusive igneous origin, most volcanic rocks, and moderate- to high-grade metamorphic rocks.

Source: Caltrans 2012

Overview of GSSPR Impacts

Table 3.9-3 identifies general types of construction and operation impacts expected to be relevant.

The methodology used to evaluate GSSPR impacts is generally based on the project's location with regard to identified hazard zones and the proximity of the project to various resources (including minerals, fossil fuel/energy resources, and paleontological resources). Analysis should include a review of the data and impact analyses in the other sections prepared for the EIR/EIS, including Safety and Security, which also addresses earthquake safety.

Include the following information in the environmental document:

- A detailed map or maps of sufficient scale to illustrate the geographic relationship of the alternatives to GSSPR
  - The map boundary shall not exceed the extent of a project segment and must clearly show the location and areal extent of project impacts and major landscape features (e.g., highways, major roads, local jurisdictions, perennial water bodies, or other geographical landmarks or features that convey relative location and size).
  - Obtain Authority, FRA, and PMT concurrence on mapping scale before preparing an administrative draft EIR/EIS.
- Size (acres) and location (e.g., maps or other exhibits such as photographs) of the affected GSSPR
- Function or type of GSSPR on affected property
- Relevant property ownership or use constraints, such as lease, easement, covenants, restrictions, or conditions, including mineral access rights

3.9.4.3 Method for Determining Significance under NEPA

NEPA does not provide a definitive threshold to determine significant or potentially significant impacts, as described in more detail in General Methodology Guidance Section 3.0.4.3. For the purposes of HSR Project EIR/EIS documents, the evaluation of NEPA impact significance does not use intensity thresholds. Use professional judgment when considering the resource context and the intensity and duration of the potential effect to determine whether an impact is significant or less than significant.

For paleontological resources, the intensity (and hence the potential significance) of an impact is generally linked to the potential for loss of scientific information, particularly new information. Typically, impact assessments are based on the extent of the physical disturbance/loss in combination with the scientific importance of the fossils involved. As discussed in Section 3.9.4.2, scientifically important (i.e., significant) fossils include those that provide taxonomic, phylogenetic, ecologic, and stratigraphic and geochronologic data and may include body fossils, casts and impressions, trace fossils, and tracks and trackways. Vertebrate fossils of all types are considered scientifically important because of their comparative rarity. Invertebrate, plant, and microfossil remains, and some fossil assemblages (associations of more than one type of fossil) may also qualify.

Table 3.9-3 Source and Description of Geology, Soils, Seismicity, and Paleontological Resources Impacts

Source of Impacts	Description of Impacts	Issues to Evaluate
Construction activities with potential for impacts related to geology, soils, and seismicity due to temporary or permanent physical change on the landscape by project facilities such as the guideway and supporting structures, HSR-related infrastructure and facilities, stations, parking structures/lots; construction activities involving geologic units known to contain, or with the potential to contain, significant paleontological resources	▪ Construction within a known fault zone, an area prone to strong seismic ground shaking, an area prone to seismically related ground failure, in a seiche or tsunami hazard area, in an inundation area, or in areas prone to landslides that could pose a risk to workers, structures, and the surrounding environment ▪ Soil-disturbing activity (e.g., excava-tion and grading) that increase the potential for erosion, subsidence, or slope failure, including landslides ▪ Construction within areas of soils that require amendment, such as expansive soil, corrosive soil, highly erosive soil; areas of settlement, subsidence, and instability; and areas of hardpan that could pose a risk to workers and nearby structures ▪ Disturbance (i.e. excavation, tunneling, etc.) or exposure of geologic unit that is known to contain, or may contain, significant paleontological resources ▪ Loss to topsoil in a large area that adversely affects the viability of the ecosystem or productivity of farming ▪ Exposing people to potential injury or loss of life or structures to damage or destruction due to geologic hazards, such as primary and secondary seismic hazards. ▪ Exposing people to potential injury of loss of life or damage or destruction of structures as a result of unstable soils or unstable slopes ▪ Reducing the availability for extraction of a known mineral, petroleum, natural gas, or other energy resource of regional or statewide value ▪ Providing a route of exposure to surface or subsurface petroleum hazards deemed a concern through a Preliminary Hazard Assessment (PHA). ▪ Providing a route of exposure to subsurface gas hazard that results in a substantial risk of loss of life or destruction of property	▪ Potential for loss of life or facilities damage as a result of surface fault rupture or creep, or primary and secondary seismic hazards ▪ Potential for financial losses related to facilities damage ▪ Potential life and safety hazards as a result of damage or failure related to soil conditions ▪ Potential for construction of cut or fill slopes to create or exacerbate slope instability that could cause loss of life or property damage ▪ Potential for project construction to result in accelerated erosion ▪ Demand for and available supply of construction aggregate ▪ Extent to which risks are addressed by assumptions referenced in the PEIR/EIS ▪ Extent to which design can be used to avoid, minimize, or mitigate property and safety risks ▪ Potential for project improvements to affect availability of mineral, petroleum, or natural gas resources; effects may be direct (e.g., alignment crosses known resource), or indirect (e.g., project would result in changed land use patterns, such that mineral resource extraction becomes an incompatible land use and is discontinued) ▪ Potential for site preparation and project construction to expose or disturb geologic units(s) identified as sensitive for paleontological resources

Table 3.9-3 Source and Description of Geology, Soils, Seismicity, and Paleontological Resources Impacts (continued)

Source of Impacts	Description of Impacts	Issues to Evaluate
Operational impacts from ongoing rail service and maintenance activities	▪ Incidence of erosion or other condition/process that results in exposure or disturbance of a geologic unit that is known to contain, or may contain, significant paleontological resources ▪ See Section 4.9.4.4 for a more detailed description of these impacts.	▪ Potential for loss of life or facilities damage as a result of surface fault rupture or creep, or primary and secondary seismic hazards ▪ Potential for financial losses related to facilities damage ▪ Potential for surface exposure and disturbance of geologic unit(s) identified as sensitive for paleontological resources ▪ Extent to which risks are addressed by assumptions referenced in the Program EIR/EIS documents ▪ Extent to which design can be used to avoid, minimize, or mitigate property and safety risks

In general, the greater the extent of loss or the more scientifically important the fossils, the greater the intensity of the impact on paleontological resources and the greater the likelihood that the impact will qualify as significant. However, consistent with the emphasis on context as a factor in evaluating significance under NEPA, even a very small loss of fossil materials may represent a substantial (intense or severe, and thus significant) loss of data in some cases where the fossils are rare, are the first of their kind, or are the first reported from the geologic unit or locality represented. For developing NEPA significance findings, consult and incorporate the opinion of subject matter experts who have particular expertise with the taxa or localities involved.

3.9.4.4 Method for Determining Significance under CEQA

Based on CEQA Guidelines, the project would have a significant impact if it:

- Exposes people or structures to potential loss of life, injuries, or destruction beyond what they are exposed to currently in the area's environment due to seismic activity or its related hazards, including fault rupture,[3] ground shaking, ground failure including liquefaction, dam failure, seiche or tsunami, and landslides
- Results in substantial soil erosion or the loss to topsoil in a large area that adversely affects the viability of the ecosystem or productivity of farming present in the area
- Renders a currently stable geologic unit or soil unstable to a degree that it would result in increased exposure of people to loss of life or structures to destruction due to geologic hazards, such as primary and secondary seismic hazards
- Is constructed on expansive soil or corrosive soils as defined in Table 18-1-B of the Uniform Building Code (1994, or most recent applicable Uniform Building Code, International Building Code, or California Building Standards Code) that result in an increased exposure of people to

[3] Refer to the most recent Alquist-Priolo Earthquake Fault Zoning map issued by the State Geologist for the area or other substantial known evidence of known faults to identify known faults in the project area. Refer to Division of Mines and Geology Special Publication 42.

loss of life or structures to destruction as a result of the soils' nature, for instance causing the collapse of the structure

- Makes a known petroleum or natural gas resource of regional or statewide value unavailable to extraction through the physical presence of the project either at the ground surface or subsurface
- Results in the loss of availability of a locally important mineral resource recovery site
- Is located in an area of subsurface gas hazard, including landfill gas, and provides a route of exposure to that hazard that results in a substantial risk of loss of life or destruction of property
- Directly or indirectly disturbs, damages, or destroys a unique paleontological resource or site
- Directly or indirectly results in loss or damage to other significant paleontological resources[4]

3.9.5 Affected Environment

The Affected Environment should include a concise summary description of existing geologic units and formations (physiography and regional geologic setting); soil types, with focus on soils with higher erosion potential (water or wind), high corrosivity, and high shrink-swell potential; areas of slides, slumps, and subsidence; items related to seismicity such as faults within 62 miles, historic earthquakes and their magnitude within 62 miles, ground acceleration, and inundation areas due to dam failures; areas of difficult excavation; mineral and energy resources including known oil, gas, and geothermal fields; and geologic formations known to harbor rare or unique fossils along the proposed HSR alignments and at proposed HSR facilities. In particular:

- Identify geologic conditions and resources, paleontological resources, and geologic/seismic hazards. A map may be created to illustrate the locations of surficial geologic units, soil associations, faults, past earthquakes and their magnitude, peak ground acceleration, inundation areas due to catastrophic dam failures, and oil, gas, and geothermal fields, alternatives, and proposed mitigation measures.
- Document established local policies concerning geologic conditions and resources, paleontological resources, and geologic/seismic hazards.
- Describe pertinent stakeholder issues and concerns from public outreach efforts and personal contact with local agencies.
- Cross-reference all sections of the EIR/EIS (by lowest heading tier, e.g., 3.X.X) that describe the resources or are related to the GSSPR resources (e.g., Biological Resources and Wetlands, Hydrology and Water, Hazardous Materials and Wastes, and Safety and Security).

Table 3.9-4 through Table 3.9-18 provide key information needed for a complete description of the Affected Environment and typical sources for the information. The sources of information are not exhaustive; sources of information must be determined for each HSR section.

4 Significant paleontological resources include those that provide taxonomic, phylogenetic, ecologic, or stratigraphic and geochronologic data. They may include any or all of the following types of remains: various types of body fossils, casts and impressions, trace fossils, and tracks and trackways, as well as some types of nest and midden deposits. Plant, animal, and microfossil remains may all qualify. Vertebrate fossils of all types are considered scientifically important because of their comparative rarity.

Table 3.9-4 Key Information and Sources for Physiography and Regional Geologic Setting

Key Information	Sources of Information
▪ Geomorphic province in which alignment is located ▪ Topographic setting in region and along alignment, including typical, maximum, and minimum elevations, slope steepness, etc. ▪ Alignment's regional geologic and tectonic setting; structural framework and key structural elements; bedrock units; Quaternary stratigraphy	▪ Geomorphic province (Norris and Webb 1990, Harden 2004) ▪ Topography – USGS topographic maps – Digital Elevation Model (see project GIS) – Conceptual engineering plans and profiles – Project description – Use at minimum of 5 data points per alignment

Table 3.9-5 Key Information and Sources for Geology along the Proposed HSR Alignment

Key Information	Sources of Information
▪ Focused information on geology along proposed project alignment and any alternative alignments – Identify and briefly describe the geologic units present, along with any key structural features ▪ State Mineral Resource Zone (MRZ) designations and site stratigraphy that is sufficient enough to provide the background for later discussions of geologic hazards and geological resources	▪ Most recent available mapping published by USGS ▪ Most recent CGS maps—The new 30 x 60 compilation quads are a good regional source ▪ Existing GIS layers from program-level analysis and technical reports ▪ Published geologic literature

Table 3.9-6 Key Information and Sources for Site Soils

Key Information	Sources of Information
▪ Soil units present along the proposed alignment – Include erosion potential, expansion (shrink-swell) potential, and corrosivity to concrete and uncoated steel. – Map units may be required for some attributes, including expansion potential.	▪ SCS County survey ▪ SSURGO data ▪ NRCS Web Soil Survey ▪ Other as appropriate

Table 3.9-7 Key Information and Sources for Geologic Hazards (Landslide Hazards)

Key Information	Sources of Information
▪ Areas of potential slope instability and land-sliding, including slides, slumps, earthflows, debris flows, etc. ▪ Areas of land subsidence ▪ Cross-reference to the section on seismically induced landslide hazards, but also cover non-seismic landslide hazards	▪ Project geotechnical studies, when available ▪ USGS landslide hazards information ▪ CGS landslide information ▪ Where available, CGS Seismic Hazards Zones Maps for additional information – If these are used, be careful about overlap/ redundancy with focused section on seismically induced landslide hazards.

Table 3.9-8 Key Information and Sources for Primary Seismic Hazards (Surface Fault Rupture)

Key Information	Sources of Information
▪ State-delineated Earthquake Fault Zones within or adjacent to the proposed alignment alignments ▪ Other faults that may pose a risk of surface rupture (i.e., other faults known or believed to be Holocene-active based on credible evidence) ▪ Recurrence interval, magnitude of anticipated rupture displacement, and type of slip/ separation, to the extent feasible ▪ Pleistocene-active structures as a rupture risk	▪ CGS official maps of Alquist-Priolo Earthquake Fault Zones of California ▪ Faults zoned by State of California ▪ CGS Digital Database of Quaternary and Younger Faults (W.A. Bryant, compiler, Ver.2, 2005) ▪ Uniform Building Code (UBC) maps of known active fault near-source zones in California and adjacent portions of Nevada – Faults not zoned by State but recognized as active seismic sources by UBC – IBC maps should also be consulted as they supersede UBC maps ▪ Local jurisdiction zoning – Additional faults not zoned by state but treated as active in local permitting process – Examples of areas where this will likely be needed include Santa Clara County and Los Angeles County ▪ Current geologic literature – Faults with substantial evidence suggesting Holocene activity/surface rupture hazard, but not yet zoned or included in UBC maps – Southern California Earthquake Center web site: www.data.scec.org – Northern California Earthquake Data Center web site: www.ncedc.org

Table 3.9-9 Key Information and Sources for Primary Seismic Hazards (Ground shaking)

Key Information	Sources of Information
▪ Faults that pose a strong ground shaking hazard in the vicinity of the proposed alignment and alternatives ▪ MCE and recurrence interval, as well as maximum anticipated ground shaking intensity ▪ Length/location of the proposed alignment and the sites of proposed stations vs. anticipated ground shaking intensity ▪ High ground motion areas based on a probabilistic PGA having a 2-percent probability of exceedance in 50 years (CBC standard).	▪ For seismogenic faults in project vicinity, same sources as listed under the Surface Fault Rupture section ▪ For ground shaking intensity, CGS and USGS ground shaking maps ▪ For MCE and other earthquake definitions, PMT Technical Memoranda and the most current Caltrans definition (of approximately Nov. 2009)

Table 3.9-10 Key Information and Sources for Secondary Seismic Hazards (Liquefaction and Other Types of Ground Failure)

Key Information	Sources of Information
▪ Areas at risk of liquefaction and other types of seismically induced ground failure (slides, slumps, differential settlement, ridgetop shattering, etc.) ▪ State-delineated zones of liquefaction hazard, along with any other relevant information – Other sources will be especially important in areas where State seismic hazards mapping has not been completed yet	▪ Where CGS Seismic Hazards Zones Maps are available, use the primary source to identify areas of liquefaction hazard ▪ Where CGS Seismic Hazards Zones Maps are not available, use local jurisdiction hazard zoning if judged reliable or statewide geologic map unit susceptibility in conjunction with probabilistic seismic hazard maps that provide the PGA having a 2-percent probability of exceedance in 50 years (CBC standard) ▪ Where published groundwater information is not available, assume shallow groundwater and saturated conditions ▪ For other types of ground failure, use geologic context based on published geologic mapping, plus PGA with 2-percent probability of exceedance in 50 years (CBC standard)

Table 3.9-11 Key Information and Sources for Secondary Seismic Hazards (Seismically Induced Landslide Hazards)

Key Information	Sources Information
▪ Areas at risk of seismically induced landsliding, including (but not necessarily limited to) State-delineated zones of seismically induced landslide hazard ▪ Areas at risk of landslides and strong ground shaking is likely to be at risk of seismically induced landslides, even if the State has not (yet) delineated a seismic hazard zone; in many cases, this section will need to cross-reference the Landslide Hazards Section	▪ Where available, use CGS Seismic Hazards Zones Maps published by the CGS to identify landslide hazard zones. ▪ Where these maps are not available, characterize the potential for slope instability based on statewide geologic map unit susceptibility in conjunction with slope gradients derived from Digital Elevation Models; compare results to any available existing landslide mapping, to verify use of appropriate unit strength/slope gradient criteria.

Table 3.9-12 Key Information and Sources for Secondary Seismic Hazards (Seismically Induced Flood Hazards)

Key Information	Sources of Information
▪ Areas at risk of tsunami or seiche-related flooding ▪ Areas at risk of dam failure inundation	▪ CGS and USGS tsunami and seiche hazard assessments ▪ Tsunami and Seiche – NOAA Center for Tsunami Research http://nctr.pmel.noaa.gov/inundation_mapping.html – Seiche mapping generally not available, but potentially available through CGS ▪ Dam Inundation – California Office of Emergency Services maintains maps – County general plan background reports frequently contain this information as well ▪ Local jurisdiction general plans ▪ Geologic and land use context information

Table 3.9-13 Key Information and Sources for Secondary Seismic Hazards (Areas of Difficult Excavation)

Key Information	Sources of Information
▪ Portions of the alignment and alternatives where project tunneling or excavation is likely to be difficult ▪ Potential hazards associated with tunneling and excavation in gassy grounds	▪ If available, use Program geotechnical report. ▪ If a Program geotechnical report is not available, evaluation should be based on geologic conditions as identified from published geologic mapping. ▪ For gassy grounds, use oil field maps, geologic maps, local maps and information, and other published sources for a given area.

Table 3.9-14 Key Information and Sources for Mineral and Energy Resources (Geological Resources)

Key Information	Sources of Information
▪ Active mining operations in the regional setting ▪ Borrow and spoil areas for the proposed project, which may be regulated under the Surface Mining and Reclamation Act of 1975 ▪ Amount of construction aggregate required for the project and if demand will exceed local supply	USGS online mineral commodity producers database

Table 3.9-15 Key Information and Sources for Mineral and Energy Resources (Mineral Resources)

Key Information	Sources of Information
▪ Mineral resources within or adjacent to the project alignment ▪ Applicable MRZ zoning under Surface Mining and Reclamation Act of 1975	▪ State of California Mineral Land Classification reports ▪ Local jurisdiction general plan, specific/area plans, and ordinances

Table 3.9-16 Key Information and Sources for Mineral and Energy Resources (Fossil Fuel Resources)

Key Information	Sources of Information
▪ Location and extent of any oil or natural gas fields intersected by the project alignment ▪ Related subsurface gas hazards	▪ Geologic mapping and literature ▪ DOGGR website www.consrv.ca.gov/DOG/index.htm

Table 3.9-17 Key Information and Sources for Mineral and Energy Resources (Geothermal Resources)

Key Information	Sources of Information
Known geothermal resources along the project alignment	▪ Geologic mapping and literature ▪ DOGGR website www.consrv.ca.gov/DOG/index.htm

Table 3.9-18 Key Information and Sources for Paleontological Resources

Key Information	Sources of Information
▪ Paleontological potential (sensitivity) of geologic units within the RSA, include information for surface-exposed geologic units as well as those present in subsurface and potentially encountered by earthwork, tunneling, foundation drilling, etc.	▪ Geologic and paleontological literature ▪ Published and project-specific geologic mapping ▪ Museum databases – UC Berkeley Museum of Paleontology – Los Angeles County Museum of Natural History – San Bernardino County Museum – San Diego County Natural History Museum – Sierra College – Fresno State University – and others, as applicable ▪ Masters' theses and Ph.D. dissertations ▪ Environmental documents and technical studies within project region ▪ California Historical Resource Information System Records; National Register of Historic Places and California Register of Historic Resources listings ▪ National Natural Landmark program registry ▪ Caltrans SER Chapter 8 (California Department of Transportation, 2012) – Note that additional useful perspective on paleontological resources impact analysis and mitigation is found in Society of Vertebrate Paleontology conformable Impact Mitigation Guidelines Committee protocols (1995, 1996)

3.9.6 Environmental Consequences

General formatting and terminology for constructing the discussion of environmental consequences is provided in Section 3.0.6, Environmental Consequences. The following direction is specific to the evaluation of GSSPR resources. Also see the *Fresno to Bakersfield Section Final EIR/EIS*, or most recent HSR project EIR/EIS, for example discussions of GSSPR impacts.

Give each impact a short descriptive title, e.g., *Soil settlement at structures or along trackway during construction,* as well as a number such as *GSSP #1*. Explain the results of the analysis prescribed in Section 0. In particular, describe how the activity or physical change causes an impact upon the resource. For example: *Imposing loads on the site, especially in areas of soft sediment, or extensive dewatering may result in soil settlement during construction.* Simplify impact discussions whenever possible with references or citations to the more detailed information in the appendices. Use tables whenever possible to summarize the impacts and simplify the text.

The NEPA and CEQA assessments shall reach specific, separate conclusions about significance for each impact based on the significance criteria and methods defined in the NEPA and CEQA subsections of Section 0. For example: *Permanent construction of an HSR aerial structure for the through-town alignment and local station will introduce new structures to the built environment where the public interacts. Public health may be impacted due to placement of the structures in areas with low soil-bearing strength, soil settlement, shrink-swell and corrosive soils, slope failures, ground shaking, and secondary seismic hazards, such as liquefaction, liquefaction-related slope movement, and liquefaction-related settlement.* Incorporate guidelines issued by the American Association of State Highway and Transportation Officials, American Railway Engineers and Maintenance of Way Association, Caltrans, and the IBC in the engineering design. Project design standards are described in Chapter 2, Alternatives, and are listed in the technical appendix, Applicable Design Standards. With proper incorporation of these guidelines, the intensity of these impacts on elevated, retained-fill, at-grade, and retained-cut segments of the alignment would be limited. Collectively, these design measures would reduce effects on public health from geologic hazards to less than significant under CEQA. The impact is also less than significant under NEPA.

3.9.7 Mitigation Measures

General formatting and terminology for constructing the discussion of mitigation measures is provided in Section 3.0.7, Mitigation Measures. The following direction is specific to GSSPR resources. Unless there is an unusual situation within a project, project-level mitigation measures typically will not be required for GSSPR resources, with the likely exception of paleontological resources. Impacts related to geologic hazards can be avoided or minimized by incorporating engineering measures and best management practices in project design, based upon federal and state regulations and on the Statewide Program EIR/EIS (Authority and FRA 2005). Carry out site-specific geotechnical investigations as design work progresses so that the project can integrate site-specific engineering solutions that adhere to regional and national technical standards and codes into the design to reduce risks associated with the geology, soils, and seismicity.

Where mitigation for impacts related to geology, soils, and seismicity is identified, develop project-level measures that are consistent with adopted program and project strategies to avoid or minimize impacts. Begin by considering programmatic mitigation strategies described in Section 3.0.7 and the geology, soils, and seismicity-related technical reports and environmental document sections in the most recent environmental documents produced by the Authority (e.g., *Fresno to Bakersfield Section Final EIR/EIS*, or more recent HSR project EIR/EIS), as applicable to the HSR project section. Refine general mitigation strategies into project-level, project-specific mitigation measures that are coupled to project-specific impacts. Design specific mitigation measures to address any significant geology, soils, and seismicity resource effects. If specific

mitigation measures cannot be formulated with precision (i.e., the precise measure(s) in a precise location with precise features), then identify performance standards. At a minimum, performance standards should include quantitative, qualitative, and location criteria to ensure the mitigation measures can be implemented and effectively reduce impact to a less-than-significant level. Deferred mitigation measures are only acceptable where there are measureable performance criteria, there is a specified time or action trigger for performance, and the Authority commits to implement them. For example, an unspecified erosion control measure that achieves a measureable level of sediment control would need to be in place prior to the commencement of construction. In the instance where mitigation measures would be implemented by another entity, such as a local jurisdiction or other agency that is not within the purview of the Authority, implementation cannot be guaranteed and the impact would therefore remain significant and unavoidable.

Identify section-specific measures to mitigate any significant effects, such as:

- Modifications to design of track right-of-way, stations, and parking facilities to avoid potential geologic, soils, and seismic impacts
- Specialized design of foundations or structures on unstable soils
- Stockpile and reuse of topsoil resources at locations where displaced by permanent improvements

Present the mitigation measures that are documented in the paleontology technical report for potentially significant impacts to paleontological resources . In all cases, ensure mitigation for impacts on paleontological resources is consistent with the recommendations of the Society of Vertebrate Paleontology (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995, 1996) and California Department of Transportation SER, as summarized in Table 3.9-19. Mitigation for paleontological resources impacts is linked directly to the identified level of sensitivity.

Table 3.9-19 Paleontological Resources Mitigation Approaches

Sensitivity	Typical Mitigation Approach
High Sensitivity (high potential)	▪ Preliminary pedestrian survey and surface salvage before construction begins ▪ Monitoring and salvage during construction, followed by specimen preparation; identification, cataloging, curation, and storage ▪ Preparation of final report describing finds and discussing their significance ▪ All work should be supervised by a qualified professional paleontologist staff (staff meeting qualifications for Principal Paleontologist per Caltrans SER Chapter 8) who maintains the necessary collecting permits and repository agreements, and has experience in the region and with the taxa involved ▪ Repository agreement should be in place before survey, salvage/recovery begin
Low Sensitivity (low potential)	▪ Protection and salvage are typically not required ▪ Construction documents should include "stop work and treat" requirement; in the event of a find of potential find, work in the area of the find should cease, the find should be protected in place, and a qualified paleontologist (Principal Paleontologist) should be contacted to assess the find and recommend appropriate treatment
Not Sensitive (no potential)	▪ Mitigation not required

Source: Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995, 1996; California Department Transportation 2012

Similarly, as to mitigation measures for impacts to paleontological resources discussed above, ensure mitigation for impacts related to geohazards and soil conditions reflects input from the geotechnical discipline, such that work by appropriately licensed staff informs the content of CEQA/NEPA mitigation. Interdisciplinary coordination will avoid undue detail in the EIR/EIS document and conflicts with the recommendations or requirements contained in the project geotechnical report.

For all GSSPR resource topics, draft the mitigation measures to facilitate transition into the Mitigation Monitoring and Enforcement Plan by clearly identifying responsibility and timing for implementation, as appropriate. Present the mitigation measures associated with the project alternatives within each geographic segment under the subheadings of Construction Impacts and Operations Measures. Organizing impacts by these two general periods of project implementation will help explain when impacts are expected to occur. The heading structure for this organizational scheme is shown in Section 3.9.11. Give each mitigation measure a short descriptive title and a number, such as *GSSP-MM#1*, which corresponds to the primary significant impact for which the measure is proposed (if practical).

3.9.8 Impacts from Implementing Mitigation Measures

General guidance for preparing the discussion of impacts from implementing mitigation measures is provided in Section 3.0.8, Impacts from Implementing Mitigation Measures.

Consider and disclose both positive and negative impacts of mitigation measures as part of the environmental analysis. Evaluate all mitigation measures, including off-site measures, using the methods in Section 0. Determine probable impacts using actual, on-the-ground analysis and describe the substantial basis for analytical conclusions (including defined thresholds or other criteria). When the impacts of mitigation measures cannot be quantified (e.g., at a specific location, in a definite extent, at a particular time or duration, or measurable alteration of the affected resource), evaluate potential impacts using clearly described assumptions based upon reasonably foreseeable outcomes.

3.9.9 Impacts Summary

3.9.9.1 NEPA Impacts

The overall structure and content of this discussion is presented in Section 3.0.9.1, NEPA Impacts. The heading structure for this organizational scheme is shown in Section 3.9.11. Use maps, as appropriate, to show locations of significant impacts of alternatives by segment.

3.9.9.2 CEQA Significance Conclusions

The overall structure and content of this discussion is presented in Section 3.0.9.2, CEQA Significance Conclusions. The heading structure for this organizational scheme is shown in Section 3.9.11. Use maps, as appropriate, to show locations of significant unavoidable impacts of alternatives by segment. Explain the reason why any mitigation measure will reduce the impacts of specific impacts and conclude what the level of significance is after mitigation. The reason for the reduction or avoidance of an impact should be directly related to the thresholds of significance.

3.9.10 Products

The RC is responsible for preparing the following products, under Authority and FRA direction, according to PMT guidance and subject to PMT quality control and assurance.

3.9.10.1 Technical Report or Appendix

In addition to the Volume 1 impacts analysis chapter, provide technical reports or Volume 2 appendices where full analysis applicable to the HSR project section requires details in excess of efficient inclusion in the EIR/EIS Volume 1. For example:

1. Volume 2, Appendix 2-E, Project Impact Avoidance and Minimization Features Analysis
2. Volume 2, Appendix 3.1-B, Regional and Local Policy Inventory
3. Volume 2, Section 3.9-A, Geology, Soils, and Seismicity Report
4. Volume 2, Section 3.9-B, Paleontological Resources Report, combining the functions of the Caltrans PIR and PER and consistent with the current Caltrans SER Chapter 8 (2012) requirements for both reports

3.9.10.2 Project EIR/EIS Volume 1

1. Summary/Table for EIR/EIS Executive Summary
2. Project Description—Geology, Soils, Seismicity, and Paleontological Resources-related Components (as applicable to HSR project section)
   a. Impact Avoidance and Minimization Features
   b. Summary Table of Impact Avoidance and Minimization Features, and Project Impacts
3. Affected Environment, Environmental Consequences and Mitigation Measures Section 3.9: Geology, Soils, Seismicity, and Paleontological Resources
4. Affected Environment, Environmental Consequences and Mitigation Measures Section 3.19: Cumulative Impacts

3.9.11 Geology, Soils, and Seismicity EIR/EIS Outline

The RC will use the following outline for organizing content related to the geology, soils, and seismicity resources in Chapter 3 of the project EIR/EIS, using the heading hierarchy and format as indicated. The RC will consider the impacts of implementing mitigation measures in Section 3.9.7.

3.9 Geology, Soils, and Seismicity
- 3.9.1 Introduction
- 3.9.2 Laws, Regulations, and Orders
  - 3.9.2.1 Federal
  - 3.9.2.2 State
  - 3.9.2.3 Regional and Local
- 3.9.3 Regional and Local Policy Analysis
- 3.9.4 Methods for Evaluating Impacts
  - 3.9.4.1 Definition of Resource Study Area
  - 3.9.4.2 Method for Determining Significance under NEPA
  - 3.9.4.3 Method for Determining Significance under CEQA
- 3.9.5 Affected Environment
  - 3.9.5.1 Project Segment 1
    - Alternative 1
    - Alternative 2
    - Alternative 3
    - Alternative N

3.9.5.2 Project Segment 2
- Alternative 1
- Alternative 2
- Alternative 3
- Alternative N

3.9.5.3 Project Segment 3
- Alternative 1
- Alternative 2
- Alternative 3
- Alternative N

3.9.5.4 Project Segment N
- Alternative 1
- Alternative 2
- Alternative 3
- Alternative N

3.9.6 Environmental Consequences

3.9.6.1 Overview

3.9.6.2 Project Segment 1
- No Project
- Alternative 1
  - Construction Impacts
  - Operations Impacts
- Alternative 2
  - Construction Impacts
  - Operations Impacts
- Alternative 3
  - Construction Impacts
  - Operations Impacts
- Alternative N
  - Construction Impacts
  - Operations Impacts

3.9.6.3 Project Segment 2
- No Project
- Alternative 1
  - Construction Impacts
  - Operations Impacts
- Alternative 2
  - Construction Impacts
  - Operations Impacts
- Alternative 3
  - Construction Impacts
  - Operations Impacts
- Alternative N
  - Construction Impacts
  - Operations Impacts

3.9.6.4 Project Segment 3
- No Project
- Alternative 1
  - Construction Impacts
  - Operations Impacts
- Alternative 2
  - Construction Impacts
  - Operations Impacts

Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.9.6.5 Project Segment N
No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.9.7 Mitigation Measures
3.9.7.1 Project Segment 1
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.9.7.2 Project Segment 2
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.9.7.3 Project Segment 3
Alternative 1
Construction Measures
Operations Measures

Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.9.7.4 Project Segment N
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.9.8 NEPA Impact Summary
3.9.8.1 Alternative 1
Construction Impacts
Operations Impacts
3.9.8.2 Alternative 2
Construction Impacts
Operations Impacts
3.9.8.3 Alternative 3
Construction Impacts
Operations Impacts
3.9.8.4 Alternative N
Construction Impacts
Operations Impacts
3.9.9 CEQA Significance Conclusions
3.9.9.1 Alternative 1
Construction Impacts
Operations Impacts
3.9.9.2 Alternative 2
Construction Impacts
Operations Impacts
3.9.9.3 Alternative 3
Construction Impacts
Operations Impacts
3.9.9.4 Alternative N
Construction Impacts
Operations Impacts

3.10 Hazardous Materials and Wastes

The methodology guidelines in this section are organized by a sequence of steps for preparing an environmental document. Section 3.10.11 provides an outline for this environmental impact report/environmental impact statement (EIR/EIS).

Section 3.0, General Methodology Guidance for Resource Sections, provides the methodological framework common to the evaluation of all resource areas. Section 3.19, Cumulative Impacts, provides the cumulative impact analysis methodology. Use data and analyses in Section 3.0 and Section 3.19 in combination with this Hazardous Materials and Wastes guidance section when developing the EIR/EIS analyses.

Development and past and current use of the study area is a key aspect in understanding the potential for contamination related to hazardous materials and wastes because particular types of land use are more prone to specific contamination concerns. Historical land use is discussed in Section 3.17, Cultural Resources, and current land use is discussed in Section 3.13, Station Planning, Land Use, and Development. Additional information regarding hazardous materials and wastes is presented in Section 3.6, Public Utilities and Energy, Section 3.8, Hydrology and Water Resources, and Section 3.9, Geology, Soils, Seismicity, and Paleontology. Section 3.11, Safety and Security, discusses emergency response preparedness in the event of leaks, spills, or accidents involving hazardous materials or wastes.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the resource section. Example text that illustrates the concepts and methods is shown in *italics*. The methods are organized to mirror the organization of the EIR/EIS section or chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

If there is a discrepancy between the material in this guidance and any adopted federal and state agency guideline or manual applicable to hazardous materials or wastes, the agency guideline or manual controls. Identify and discuss any such discrepancy with the California High-Speed Rail Authority (Authority), Federal Railroad Administration (FRA), and the Program Management Team (PMT) before deviating from this guidance.

3.10.1 Introduction

The general method for preparing an introduction for this resource section is provided in Section 3.0.1, Introduction. The following discussion presents direction specific to Hazardous Materials and Wastes.

Refer specifically to related content in other sections of the EIR/EIS that influence or are influenced by the Hazardous Materials and Wastes impact analysis (e.g., data and analyses for public utilities and energy, hydrology and water, safety and security, station planning and land use, agricultural lands, cultural resources, and geology, soils, and seismicity) and supportive/associated technical documents. References to other documents must include citations to specific sections (by lowest heading tier, e.g., 3.X.X), not just a general reference to a chapter in EIR/EIS.

3.10.2 Laws, Regulations, and Orders

Federal, state, and local laws, regulations, orders or plans relevant to hazardous materials and wastes affected by the project are presented below. General National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) requirements for assessment and disclosure of environmental impacts are described in Section 3.1, Introduction, and are therefore not restated in this resource section.

3.10.2.1 Federal

There are numerous federal regulations relating to the identification, generation, transport, storage, handling, treatment, and disposal of hazardous materials and wastes. The following list of laws is likely to be applicable to the project and is provided for initial reference. Determine specific applicability to, and use for, analyzing impacts associated with the particular high-speed rail (HSR) project section.

Procedures for Considering Environmental Impacts (64 Fed. Reg. 28545)

These Federal Railroad Administration (FRA) procedures state than an EIS should consider possible impacts on public safety, including any impacts due to hazardous materials.

Resource Conservation and Recovery Act (42 U.S.C. § 6901 et seq.)

The Resource Conservation and Recovery Act (RCRA) regulates the identification, generation, transportation, storage, treatment, and disposal of solid and hazardous materials and hazardous wastes.

Comprehensive Environmental Response, Compensation and Liability Act (42 U.S.C. § 9601 et seq.)

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) regulates former and newly discovered uncontrolled waste disposal and spill sites. CERCLA established the National Priorities List of contaminated sites, and the "Superfund" cleanup program.

Clean Air Act (42 U.S.C. § 7401 et seq.)

The Clean Air Act protects the general public from exposure to airborne contaminants that are known to be hazardous to human health. Under the Clean Air Act, the U.S. Environmental Protection Agency established National Emissions Standards for Hazardous Air Pollutants, which are emissions standards for air pollutants, including asbestos.

Clean Water Act, Section 402(p) (33 U.S.C. § 1342(p))

The Clean Water Act regulates discharges and spills of pollutants, including hazardous materials, to surface waters and groundwater.

Safe Drinking Water Act (42 U.S.C. § 300(f) et seq.)

The Safe Drinking Water Act regulates discharges of pollutants to underground aquifers and establishes standards for drinking water quality.

Toxic Substances Control Act (15 U.S.C. § 2601 et seq.)

The Toxic Substances Control Act regulates manufacturing, inventory, and disposition of industrial chemicals including hazardous materials.

Federal Insecticide, Fungicide and Rodenticide Act (7 U.S.C. § 136 et seq. and 40 C.F.R. Parts 152.1–171)

The Federal Insecticide, Fungicide and Rodenticide Act regulates the manufacturing, distribution, sale, and use of pesticides.

Hazardous Materials Transportation Act (49 U.S.C. § 5101 et seq. and 49 C.F.R. Parts 101, 106, 107, and 171–180)

The Hazardous Materials Transportation Act regulates the transport of hazardous materials by motor vehicles, marine vessels, and aircraft.

Hazardous Materials Transportation Uniform Safety Act of 1990 (Public Law 101-615)

The Hazardous Materials Transportation Uniform Safety Act regulates the safe transport of hazardous material in intrastate, interstate, and foreign commerce. The statute includes provisions to encourage uniformity among different state and local highway routing regulations, to develop criteria for the issuance of federal permits to motor carriers of hazardous materials, and to regulate the transport of radioactive materials.

Emergency Planning and Community Right to Know Act (42 U.S.C. § 11001 et seq. and 40 C.F.R. Part 350.1 et seq.)

The Emergency Planning and Community Right to Know Act regulates facilities that use hazardous materials in quantities that require reporting to emergency response officials.

Federal Compliance with Pollution Control (USEO 12088)

U.S. Presidential Executive Order (USEO) 12088 requires federal agencies to take necessary actions to prevent, control, and abate environmental pollution from federal facilities and activities under control by federal agencies.

3.10.2.2 State

There are numerous state regulations relating to the identification, generation, transport, storage, handling, treatment, and disposal of hazardous materials and wastes. The following list of laws is likely to be applicable to the project and is provided for initial reference. Determine specific applicability to, and use for, analyzing impacts associated with the particular HSR project section.

Well Safety Devices for Critical Wells (Cal. Code Regs., tit. 14, § 1724.3)

This regulation governs safety devices required on "critical wells" located within 100 feet of an operating railway.

Gas Monitoring and Control at Active and Closed Disposal Sites (Cal. Code Regs., tit. 27, § 20917 et seq.)

The regulations within Article 6 set forth the performance standards and the minimum substantive requirements for landfill gas monitoring and control as it relates to active solid waste disposal sites and to proper closure, post closure maintenance, and ultimate reuse of solid waste disposal sites to ensure that public health and safety and the environment are protected from pollution due to the disposal of solid waste.

Closure and Post Closure Maintenance of Landfills (Cal. Code Regs., tit. 27, Subchapter 5)

This regulation provides post closure maintenance guidelines, including requirements for an emergency response plan and site security. It regulates post closure land use, requiring protection of public health and safety and the built environment, as well as the prevention of gas explosions. Construction on the site must maintain the integrity of the final cover, drainage and erosion control systems, and gas monitoring and control systems. All post-closure land use within 1,000 feet of a landfill site must be approved by the local enforcement agency.

California Public Resources Code Section 21151.4

This code requires the lead agency to consult with any school district with jurisdiction over a school within 0.25 mile of the project about potential impacts on the school if the project might reasonably be anticipated to emit hazardous air emissions or handle an extremely hazardous substance or a mixture containing an extremely hazardous substance.

Porter-Cologne Water Quality Control Act (Cal. Water Code, § 13000 et seq.)

The Porter-Cologne Water Quality Control Act regulates water quality through the State Water Resources Control Board and Regional Water Quality Control Boards, including oversight of water monitoring and contamination cleanup and abatement.

Hazardous Materials Release Response Plans and Inventory Law (Cal. Health and Safety Code, § 25500 et seq.)

This section of the California Health and Safety Code requires facilities using hazardous materials to prepare Hazardous Materials Business Plans.

Hazardous Waste Control Act (Cal. Health and Safety Code, § 25100 et seq.)

This act is similar to RCRA on the federal level in regulating the identification, generation, transportation, storage, and disposal of materials deemed hazardous by the State of California.

Safe Drinking Water and Toxic Enforcement Act (Proposition 65, Cal. Health and Safety Code, § 25249.5 et seq.)

The Safe Drinking Water and Toxic Enforcement Act is similar to the Safe Drinking Water Act and Clean Water Act on the federal level in regulating the discharge of contaminants to groundwater.

Cortese List Statute (Cal. Gov. Code, § 65962.5)

This regulation requires the Department of Toxic Substances Control to compile and maintain lists of potentially contaminated sites located throughout the State of California (includes the Hazardous Waste and Substances Sites List).

3.10.2.3 Regional and Local

Compile a complete inventory of adopted local and regional plans, ordinances, or guidelines related to hazardous materials and wastes. Use a tabular format similar to that used in the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014), or a more recent HSR project EIR/EIS, to organize and concisely report this information.

Senate Bill 1082, passed in 1993, created the Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program). The Unified Program (California Environmental Protection Agency 2009) consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of six environmental and emergency response programs. The California Environmental Protection Agency and other state agencies set the standards for their programs, while local governments implement the standards. These local implementing agencies are called Certified Unified Program Agencies (CUPA). For each county, the CUPA regulates/oversees:

- Hazardous materials business plans
- California accidental release prevention plans or federal risk management plans
- The operation of underground storage tanks and aboveground storage tanks
- Universal waste and hazardous waste generators/handlers
- Onsite hazardous waste treatment
- Inspections, permitting, and enforcement
- Proposition 65 reporting
- Emergency response

Beyond the statewide regulations, CUPAs administer policies and regulations found in a number of local and regional plans (including general plans and municipal codes) that address hazardous materials and wastes. Policies and regulations are intended as guides for the appropriate use of potentially hazardous materials, the cleanup of contaminated sites, and the preparation of emergency response plans. Use a tabular format similar to that used in the *Fresno to Bakersfield*

Section Final EIR/EIS, or a more recent HSR project EIR/EIS, to organize and report this information.

- City and county general plan safety elements, emergency operation plans, hazardous materials emergency response plans, comprehensive plans, specific plans, documents and maps provided by city and county planning departments, etc., as applicable
- City and county hazardous materials or emergency response ordinances
- County Health Department or Air Pollution Control District plans or procedures regarding air-, soil-, or water-borne pathogen control and exposure management

3.10.3 Regional and Local Policy Analysis

The overall structure of this discussion is presented in Section 3.0.3, Regional and Local Policy Analysis. As described in more detail in subsection 3.0.3.2, this analysis will describe any inconsistency or conflict with adopted regional or local policies and implementation of the HSR project.

3.10.4 Methods for Evaluating Impacts

Evaluation of impacts on hazardous materials and wastes is a requirement of CEQA and NEPA. Summarize the use, generation, transportation, and disposal of hazardous materials and wastes plus the presence of contaminated sites in the corridor based on information available from the review of publically available records, historic maps and aerial photographs, and site reconnaissance generally based on the California Department of Transportation (Caltrans) Standard Environmental Reference, Chapter 10, Initial Site Assessment guidance document and ASTM International Standard E 1528-06 (ASTM 2006) and, if needed, Standard E 1527-05 (ASTM 2005).

ASTM Standard E 1528-06 is typically followed when historical records, photographs, or other evidence does not suggest a property is already contaminated. In instances where the analyst suspects contamination may be present, complete a Phase I Environmental Site Assessment based on ASTM Standard E 1527-05.

Note that the methodology is not intended to be a parcel-level due diligence assessment for the purpose of property acquisition or transfer. A detailed hazardous materials assessment, or Phase II evaluation, of individual parcels that are potentially subject to property transfer or acquisition would occur after completion of the NEPA/CEQA environmental review process, during final design and project implementation.

Also describe prior and on-going efforts to avoid the use of contaminated sites and the use, generation, or release of hazardous materials and waste, including reference to impact avoidance and minimization features described in Section 2.5.2, HSR Build Alternatives. This section describes the methodology for developing the resource study area (RSA) and for evaluating effects under CEQA and NEPA. Subsequent sections in this methodology guideline provide direction for the design of mitigation measures and the structure for presenting content related to hazardous materials and wastes in the EIR/EIS documents.

3.10.4.1 Definition of Resource Study Area

The RSA is the area in which all environmental investigations specific to hazardous materials and wastes are conducted to determine the resource characteristics and potential impacts of the project segment. The factors making up the RSA and the description and illustration of the elements comprising the RSA are provided in Section 3.0.4.1, Definition of Resource Study Area, and Section 3.0.4.2, Methodology for Impact Analysis.

The boundaries of the RSA for hazardous materials and wastes extend beyond the project footprint. Focus on the effects of the presence of hazardous materials and wastes in managed

conditions or as contaminants in the nearby environment, on the construction and operation of the HRS project. Consider the effects of the project's use of hazardous materials and generation of hazardous wastes on the surrounding environment.

The project's physical and operational elements of the RSA are described in Table 3.10-1, which presents the required information sources and baseline metrics to help define the RSA.

The resource study area for cumulative effects will be a broader area depending on the project section and will consider adjacent HSR project sections to ensure a broad consideration of impacts on a more regional and statewide basis. See Section 3.19, Methodology for Cumulative Impacts, for a more detailed discussion.

Table 3.10-1 Resource Study Area Information

Required Information	Resource Study Area
▪ Conceptual engineering plans and profiles ▪ Project description, including the types of hazardous materials or chemicals that would be utilized at maintenance sites during HSR operation ▪ Borrow areas ▪ Online databases and publically available information related to the use, storage, and disposal of hazardous materials and wastes in the project area ▪ Online databases and publically available information related to contaminated sites along the project corridor ▪ Online databases and publically available information related to the location and condition of landfills, oil and gas well, and schools along the project corridor ▪ Historic topographic maps and aerial photographs of the project corridor	▪ Consists of the project footprint for tracks, stations, and heavy maintenance facilities (including a Heavy Maintenance Facility, Maintenance-of-Way, Terminal Maintenance & Storage), plus a 150-foot buffer of the project footprint to account for hazardous material and waste issues on adjacent properties ▪ Study area near school locations—0.25 mile on either side of the project footprint ▪ Alignment – Existing conditions and locations where right-of-way may need to be acquired – Laydown and staging areas – Proximity to hazardous materials sites of potential concerns ▪ Vertical construction profile—Potential areas requiring excavation, trenching, or other subsurface work that would require assessment of potential hazardous materials contamination ▪ Structures, roadways, borrow areas—Similar lateral and vertical considerations as rail alignment, assessing proximity to hazards and potential for hazardous materials contamination ▪ Borrow areas—Large potential sources of fill material that would require assessment of potential hazardous materials contamination ▪ Potential Environmental Concern Site Database Search—One-mile buffer area on either side of the alternative alignment centerlines ▪ Land uses adjacent to landfills—Increase to 0.25 mile on either side of the construction footprint to analyze the potential for a change in land use adjacent to landfills, consistent with 27 CCR, to assess landfill potential to release methane gas which may present an explosion risk

3.10.4.2 Methodology for Impact Analysis

Group and consolidate information and discussion in the EIR/EIS to effectively present content to the lay audience (i.e., by distinct resource characteristic or component, such as building materials, landfills, oil and gas wells, and potential environmental concern (PEC) sites). Detailed information on these subjects and potential changes in the production, dispensing, use, transport, or disposal of hazardous materials and wastes as a result of the proposed HSR alternatives should be included in a technical appendix in Volume 2 of the EIR/EIS. Provide specific reference to the technical report in the hazards materials and wastes resource section of Chapter 3 to help the reader navigate between volumes.

Analyze direct and indirect impacts related to hazardous materials and wastes through quantitative analysis and, where necessary, with qualitative analysis. Analyze impacts which may occur during construction and operation of the HSR system (*note*: the analytical results for construction impacts and operations impacts are presented separately in the EIR/EIS). Apply the same impact thresholds in both project timeframes.

Begin the analysis with consideration of impact avoidance and minimization features that are incorporated into the project in Section 2.5.2, HSR Build Alternatives, and evaluated in Volume 2, Appendix 2-E. Account for implementation of design features or best management practices, such as compliance with federal and state guidelines for minimizing construction exposure to hazardous materials and wastes. Refer to the summary table of impact avoidance and minimization features and explain how particular features avoid impacts or ensure less-than-significant impacts to hazardous materials and wastes.

Base the analysis on a review of available reports and data (including federal and state statutes, resource agency, local, and regional agency policies and ordinances), discussions with agency representatives in the region, field investigation, modeling (where applicable), and professional judgment. Some types of localized information will not be in published reports and may be obtainable only by conferring with local agency representatives. Develop GIS databases for each project segment. Develop GIS data (a) as part of project design or (b) from available federal, state, and local sources. Provide sufficient detail to allow complete analysis of the anticipated design of the completed project or of reasonable assumptions for project implementation, including the location PEC sites, landfills, and oil and gas wells. Focus analysis on the project's potential to alter existing conditions of the affected resources in the RSA(s). Identify where permit applications will be needed and provide analysis to support future permit review.

As mentioned earlier, follow a methodology generally based on Caltrans's Initial Site Assessment guidance and specified by ASTM Standard Practice E 1528-06 (ASTM 2006) and E 11527-05 (ASTM 2005). Include a review of the data and impact analyses in the other sections prepared for the EIR/EIS, including Hydrology and Water Resources, Geology, Soils, and Seismicity, and Safety and Security, which discusses emergency response in the event of an incident involving hazardous materials or wastes.

Physical and operational elements of the project are described in Table 3.10-2, which presents the sources and description of impacts.

For all impacts, determine significance of impacts under NEPA and CEQA based on the application of the following methods.

Table 3.10-2 Source and Description of Hazardous Materials and Wastes Impacts

Source of Impacts	Description of Impacts
Construction activities with potential for impacts to hazardous materials and wastes due to temporary or permanent physical change on the landscape by project facilities such as the guideway and supporting structures, HSR-related infrastructure and facilities, stations, parking structures/lots	▪ Construction activities result in a significant hazard to the public or the environment due to the reasonably foreseeable upset and accident conditions that involves the release of hazardous materials into the environment. ▪ Construction activities take place on a site on the Cortese list and those construction activities have the potential to create a significant hazard to the public or the environment due to the release of hazardous materials or wastes associated with the site. ▪ Construction activities would emit hazardous air emissions or handle extremely hazardous substances or mixtures containing extremely hazardous substances within 0.25 mile of a school that would pose a health and safety hazard to students or employees. ▪ Construction activities would mobilize or emit endemic air-, soil-, or water-based pathogens that potentially pose a health hazard to construction workers or the public in areas proximate to construction activities.
Operational impacts from ongoing rail service and maintenance activities of the HSR system	▪ Project operation results in a significant hazard to the public or the environment due to the routine transport, use, or disposal of hazardous materials. ▪ Project operation results in a significant hazard to the public or the environment due to the reasonably foreseeable upset and accident conditions that involves the release of hazardous materials into the environment. ▪ Project facilities are located on a site that is on the Cortese list and the operational activities that take place on that site have the potential to create a significant hazard to the public or the environment. ▪ Operational activities would emit hazardous air emissions or handle extremely hazardous substances or mixtures containing extremely hazardous substances within 0.25 mile of a school that such use would pose a health and safety hazard to students or employees.

3.10.4.3 Method for Determining Significance under NEPA

NEPA does not provide a definitive threshold to determine significant or potentially significant impacts from hazardous materials and waste, as described in more detail in Section 3.0.4.3, Method for Determining Significance under NEPA. In cases where there are no defined thresholds, use professional judgment when considering the resource context, the intensity and duration of the potential effect, and implementation of mitigation measures to determine the significance of impacts. Consider relevant aspects of context (e.g., existing resource conditions, resource sensitivity) and appropriate factors of intensity (e.g., extent of change, duration of change) for determining impact significance. Also consider project actions that improve or otherwise benefit resource values in the evaluation of impact significance.

3.10.4.4 Method for Determining Significance under CEQA

Based on CEQA Guidelines, the project would have a significant impact if it would:

- Create a significant hazard to the public or the environment due to the routine transport, use, or disposal of hazardous materials

- Create a significant hazard to the public or the environment due to the reasonably fore-seeable upset and accident conditions that involve the release of hazardous materials into the environment
- Be located on a site that is on the Cortese list and the project activities that take place on that site have the potential to create a significant hazard to the public or the environment due to the release of hazardous materials or wastes associated with the listed site
- Emit hazardous air emissions or handles extremely hazardous substances or mixtures containing extremely hazardous substances within 0.25 mile of a school that such use would pose a health and safety hazard to students or employees

3.10.5 Affected Environment

Include a concise summary description of existing landfills, oil and gas wells, and PEC sites along the proposed HSR alignments and at proposed HSR facilities. In particular:

- Identify all relevant PEC sites or contaminant plumes within 150 feet of the project footprint. Create a map to illustrate the locations of PEC sites and alternatives.
- Document established local policies concerning the context of residual or left-in-place contaminants-related impacts.
- Describe pertinent stakeholder issues and concerns from public outreach efforts and personal contact with local agencies.
- Cross-reference all subsections of the EIR/EIS (by lowest heading tier, e.g., 3.X.X) that describe the resources or are related to the resources (e.g., Cultural Resources and Paleontological Resources discusses historic land use, Hydrology and Water Resources discuss groundwater, which can affect the transport of contaminants, Geology, Soils, and Seismicity discusses subsurface conditions that can affect the transport of contaminants).

Table 3.10-3 through Table 3.10-6 provide key information needed for a complete description of the Affected Environment and typical sources for the information.

Table 3.10-3 Key Information and Sources for Historic Land Use

Key Information	Sources of Information
▪ Information regarding historic development, historic land use, past use, storage, release, and disposal of hazardous materials, and government records of hazardous materials storage, use, release, disposal, and potential contamination – This shall include (a) information from relevant databases as identified in ASTM Standard E1528-06, (b) current and historic USGS topographic maps, (c) current and historic aerial photos, preferably a minimum of one photo per 10-year period	Records search through Environmental Data Resources, Inc., or an equivalent source

Table 3.10-4 Key Information and Sources for Geology, Hydrogeology, Topography, Surface Water, Ground Water

Key Information	Sources of Information
▪ Regional geology, soils, and hydrogeology, with descriptions of how these conditions change across the study area – Focus on major changes that would affect hazards and hazardous materials ▪ Historic and current topography and surface water bodies within the RSA, in proximity to alignment and other project improvements ▪ Representative groundwater conditions (such as depth, extent, water quality) within the RSA	▪ Regional and RSA geology, hydrogeology, soils—Geology Study ▪ Surface water bodies and groundwater—Hydrology and Water Quality Study ▪ Historic and current topographic maps

Table 3.10-5 Key Information and Sources for Historic and Current State of Development and Use

Key Information	Sources of Information
▪ General type(s) of land use, from either the first developed use or 1940 (whichever is earlier) to the present use within the RSA ▪ Past and current uses of representative areas within the RSA, such as areas that are pre-dominantly industrial, commercial, agricultural, residential, railroads, highway, etc. ▪ Readily identifiable hazardous materials associated with the past and current uses of the representative areas within the RSA ▪ Uses in the surrounding area, to the extent this information is revealed by current or historic documents in the course of researching	▪ Historic and current aerial photographs, minimum of decade service from date of first readily available ▪ Historic and current topographic maps ▪ Current land use maps from general plans within the RSA ▪ Site reconnaissance ▪ Insurance maps ▪ Visual survey of current development and uses obtained by viewing the RSA from publicly accessible locations. Entrance of private property and interior surveys of buildings, systems, and structures are not included.

Table 3.10-6 Potential Environmental Concerns

Key Information	Sources of Information
Sites with Potential Environmental Concerns (PEC) within the RSA, include: ▪ Site name ▪ Address/location ▪ Conditions representing concern (database results, files findings, visual observations, etc.) ▪ Current regulatory status of the PEC site ▪ Current conditions related to routine transport, use, and disposal of hazardous materials within the RSA ▪ Past upsets or accidents within the RSA, resulting in release of hazardous materials into the environment ▪ Existing or proposed schools within one-quarter mile of the project area ▪ Proposed project under CCR for gas monitoring and control at active and closed disposal sites ▪ Records of exposure to and statistics related to incidents of illness associated with endemic air-, soil-, or water-borne pathogens within the RSA	▪ Government environmental database record search results ▪ Review of readily available regulatory agency files and consultation with agency personnel as needed to determine current conditions and regulatory status ▪ Review of historic aerial photographs and topographic maps ▪ Site reconnaissance from publicly accessible areas, documented with photographs of observed PEC ▪ Federal Railroad Administration Railroad Property Special Waste Screening Form ▪ Caltrans Transaction Screen Form, Appendix A of Caltrans Initial Site Assessment Guidance Document, 2006 ▪ Transaction Screen Environmental Site Assessment, ASTM Standard E 1528-06 ▪ Department of Conservation's Division of Oil, Gas and Geothermal Resources lists of old and abandoned facilities ▪ Observation or records of commercial vehicle traffic for indications of vehicles transporting hazardous materials (fuel trucks, supply trucks, rail tanker cars, etc.) ▪ Accident records or statistics related to incidents of hazardous materials spills or releases within the project area, such as review of emergency response or fire department records or databases and California Highway Patrol accident records ▪ Schools—Locations and proximity; local school districts maps/websites or other sources as appropriate ▪ Department of Public Health, County Health Departments, or local Air Pollution Control Districts databases of endemic pathogen-related illness (e.g., Valley Fever in the San Joaquin Valley)

3.10.6 Environmental Consequences

General formatting and terminology for constructing the discussion of environmental consequences is provided in Section 3.0.6, Environmental Consequences. The following direction is specific to the evaluation of hazardous materials and wastes. Also see the *Fresno to Bakersfield Final EIR/EIS,* or more recent HSR project EIR/EIS, for an example of discussions of Hazardous Materials and Wastes impacts. The heading structure for the Hazardous Materials and Wastes EIR/EIS discussion is shown in Section 3.10.11.

Give each impact a short descriptive title that describes how the activity or physical change causes an impact upon the resource, e.g., *Construction activities may incur accident conditions that involve the release of hazardous materials into the environment,* as well as a number, e.g., *HMW #1*. Explain the results of the analysis prescribed in Section 0. Simplify impact discussions whenever possible with references or citations to the more detailed information in the appendices. Use tables whenever possible to summarize the impacts and simplify the text.

The NEPA and CEQA assessments shall reach specific, separate conclusions about significance for each impact based on the significance criteria and methods defined in the NEPA and CEQA subsections of Section 0. For example:

Construction of any of the project alternatives, stations, and maintenance facilities would temporarily increase the regional transport, use, storage, and disposal of hazardous materials and petroleum products (such as diesel fuel, lubricants, paints and solvents, and cement products containing strong basic or acidic chemicals). These materials are commonly used at construction sites. Hazardous waste generated during construction might consist of welding materials, fuel and lubricant containers, paint and solvent containers, and cement products containing strong basic or acidic chemicals.

Hazardous wastes (including asbestos-containing materials and lead-based paint) might also be generated during demolition of existing buildings. Demolition of buildings and roadways containing asbestos and lead-based materials requires specialized procedures and equipment and appropriately certified personnel. Buildings and roadways intended for demolition that were constructed before 1980 will be surveyed for asbestos-containing materials. Those constructed before 1971 will also be surveyed for lead. A demolition plan for any location with positive results for asbestos or lead would be prepared. The plan would specify how to appropriately contain, remove, and dispose of the asbestos- and lead-containing material while meeting all requirements and best management practices (BMP) to protect human health and the environment.

Facilities and construction sites that use, store, generate, or dispose of hazardous materials or wastes and hazardous material/waste transporters are required to maintain plans for warning, notification, evacuation, and site security under regulations, as described in Section 3.10.2, Laws, Regulations, and Orders. The project would require a Construction General Permit (Order 2009-0009-DWQ), which requires the designation of special storage areas and labeling, containment berms, coverage from rain, concrete washout areas, and many other BMPs designed to minimize release of contaminants from construction sites.

Accidental spills or releases could occur during transport, storage, use, or disposal of hazardous materials and wastes during construction. Standard accident and hazardous materials recovery training and procedures are enforced by the state and followed by private state-licensed, certified, and bonded transportation companies and contractors. Further, a spill prevention, containment, and countermeasures (SPCC) plan or, for smaller quantities, a spill prevention and response plan, which identifies BMPs for spill and release prevention and provides procedures and responsibilities for rapidly, effectively, and safely cleaning up and disposing of any spills or releases, would be established for the project. The intent of the SPCC regulation is prevention, not the after-the-fact reactive measures commonly described in contingency plans. Contingency plans address spill containment and cleanup and management of contaminated soil and groundwater in the event of an accidental spill. As required under state and federal law, plans for notification and evacuation of site workers and local residents in the event of a hazardous materials release would be in place throughout construction.

Compliance with various federal, state, and local regulations minimizes the risk of a spill or accidental release of hazardous materials, and therefore the impact of such a release would be less than significant under NEPA and under CEQA.

3.10.7 Mitigation Measures

General formatting and terminology for constructing the discussion of mitigation measures is provided in Section 3.0.7, Mitigation Measures. The following direction is specific to hazardous materials and wastes. Present the mitigation measures associated with the project alternatives within each geographic segment under the subheadings of Construction Impacts and Operations Measures. Organizing impacts by these two general periods of project implementation will help explain when impacts are expected to occur. The heading structure for this organizational scheme is shown in Section 3.10.11. Give each mitigation measure a short descriptive title and a number, such as *HMW-MM#1*, which corresponds to the primary significant impact for which the measure is proposed (if practical).

Develop project-level measures that are consistent with adopted program and project strategies that avoid or minimize impacts. Begin by considering programmatic mitigation strategies described in Section 3.0.7 and the hazardous materials and wastes-related technical reports and environmental document sections in the most recent environmental documents produced by the Authority (e.g., *Fresno to Bakersfield Section Final EIR/EIS*, or more recent HSR project EIR/EIS, as applicable to the HSR project section.

Refine general mitigation strategies into project-level, project-specific mitigation measures that are coupled to project-specific impacts. Design specific mitigation measures to address any significant hazardous materials or wastes effects. If specific mitigation measures cannot be formulated with precision (i.e., the precise measure(s) in a precise location with precise features), identify performance standards. At a minimum, performance standards should include quantitative, qualitative, and location criteria, to ensure the mitigation measures can be implemented and effectively reduce the impact to a less-than-significant level. Deferred mitigation measures are only acceptable where there are measureable performance criteria, there is a specified time or action trigger for performance, and the Authority commits to implement them. In the instance where mitigation measures would be implemented by another entity, such as a local jurisdiction or other agency that is not within the purview of the Authority, implementation cannot be guaranteed and the impact would therefore remain significant and unavoidable.

Draft mitigation measures to facilitate transition into the Mitigation Monitoring and Enforcement Plan by clearly identifying responsibility and timing for implementation, as appropriate. For example, the project will limit the use of extremely hazardous materials near schools during construction. The contractor shall not handle an extremely hazardous substance (as defined in CPRC § 21151.4) or a mixture containing extremely hazardous substances in a quantity equal to or greater than the state threshold quantity specified pursuant to HSC Section 25532(j) within 0.25 mile of a school. Signage would be used to delimit all work areas within 0.25 mile of a school, and the contractor would be required to monitor all use of extremely hazardous substances.

3.10.8 Impacts from Implementing Mitigation Measures

General guidance for constructing the discussion of impacts from implementing mitigation measures is provided in Section 3.0.8, Impacts from Implementing Mitigation Measures.

Consider and disclose both positive and negative impacts of mitigation measures as part of the environmental analysis. Evaluate all mitigation measures, including off-site measures, using the methods in Section 0. Determine probable impacts using actual, on-the-ground analysis and describe the substantial basis for analytical conclusions (including defined thresholds or other criteria). When the impacts of mitigation measures cannot be quantified (e.g., at a specific location, in a definite extent, at a particular time or duration, or measurable alteration of the affected resource), evaluate potential impacts using clearly described assumptions based upon reasonably foreseeable outcomes.

3.10.9 Impacts Summary

3.10.9.1 NEPA Impacts

The overall structure and content of this discussion is presented in Section 3.0.9.1, NEPA Impacts. The heading structure for this organizational scheme is shown in Section 3.10.11. Use maps, as appropriate, to show locations of significant impacts of alternatives by segment.

3.10.9.2 CEQA Significance Conclusions

The overall structure and content of this discussion is presented in Section 3.0.9.2, CEQA Significance Conclusions. The heading structure for this organizational scheme is shown in Section 3.10.11. Use maps, as appropriate, to show locations of significant unavoidable impacts of alternatives by segment. Explain the reason why any mitigation measure will reduce the significance of specific impacts and conclude the level of significance is after mitigation. The reason for the reduction or avoidance of an impact should be directly related to the thresholds of significance.

3.10.10 Products

The RC is responsible for preparing the following products, under Authority and FRA direction, according to PMT guidance and subject to PMT quality control and assurance.

3.10.10.1 Technical Report

In addition to the Volume 1 impacts analysis chapter, provide a technical report where full analysis applicable to the HSR project section requires details in excess of efficient inclusion in the EIR/EIS Volume 1. For example:

1. Volume 2, Appendix 2-E, Project Impact Avoidance and Minimization Features Analysis
2. Volume 2, Appendix 3.1-B, Regional and Local Policy Inventory
3. Volume 2, Appendix 3.10-D, Applicable Design Standards
4. Hazardous Materials and Wastes Technical Report

3.10.10.2 Project EIR/EIS Volume 1

1. Summary/Table for EIR/EIS Executive Summary
2. Project Description—Hazardous Materials and Wastes-related Components
    a. Impact Avoidance and Minimization Features
    b. Summary Table of Impact Avoidance and Minimization Features and Project Impacts
3. Affected Environment, Environmental Consequences and Mitigation Measures Section: Hazardous Materials and Wastes
4. Affected Environment, Environmental Consequences and Mitigation Measures Section: Cumulative Impacts

3.10.11 Hazardous Materials and Wastes Outline EIR/EIS Outline

The RC will use the following outline for organizing content related to the hazardous materials and wastes in Chapter 3 of the project EIR/EIS, using the heading hierarchy and format as indicated. The RC shall consider the impacts of implementing mitigation measures in Section 3.10.7.

- 3.10 Hazardous Materials and Waste
  - 3.10.1 Introduction
  - 3.10.2 Laws, Regulations, and Orders
    - 3.10.2.1 Federal
    - 3.10.2.2 State
    - 3.10.2.3 Regional and Local
  - 3.10.3 Regional and Local Policy Analysis
  - 3.10.4 Methods for Evaluating Impacts
    - 3.10.4.1 Definition of Resource Study Area
    - 3.10.4.2 Method for Determining Significance under NEPA
    - 3.10.4.3 Method for Determining Significance under CEQA
  - 3.10.5 Affected Environment
    - 3.10.5.1 Project Segment 1
      - Alternative 1
      - Alternative 2
      - Alternative 3
      - Alternative N
    - 3.10.5.2 Project Segment 2
      - Alternative 1
      - Alternative 2
      - Alternative 3
      - Alternative N
    - 3.10.5.3 Project Segment 3
      - Alternative 1
      - Alternative 2
      - Alternative 3
      - Alternative N
    - 3.10.5.4 Project Segment N
      - Alternative 1
      - Alternative 2
      - Alternative 3
      - Alternative N
  - 3.10.6 Environmental Consequences
    - 3.10.6.1 Overview
    - 3.10.6.2 Project Segment 1
      - No Project
      - Alternative 1
        - Construction Impacts
        - Operations Impacts
      - Alternative 2
        - Construction Impacts
        - Operations Impacts
      - Alternative 3
        - Construction Impacts
        - Operations Impacts

Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.10.7.2 Project Segment 2
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.10.7.3 Project Segment 3
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.10.7.4 Project Segment N
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.10.8 NEPA Impact Summary
3.10.8.1 Alternative 1
Construction Impacts
Operations Impacts
3.10.8.2 Alternative 2
Construction Impacts
Operations Impacts

3.10.8.3 Alternative 3
Construction Impacts
Operations Impacts
3.10.8.4 Alternative N
Construction Impacts
Operations Impacts
3.10.9 CEQA Significance Conclusions
3.10.9.1 Alternative 1
Construction Impacts
Operations Impacts
3.10.9.2 Alternative 2
Construction Impacts
Operations Impacts
3.10.9.3 Alternative 3
Construction Impacts
Operations Impacts
3.10.9.4 Alternative N
Construction Impacts
Operations Impacts

3.11 Safety and Security

The methodology guidelines in this section are organized by a sequence of steps for preparing an environmental document. Section 3.11.11 provides an outline for the environmental impact report/environmental impact statement (EIR/EIS) section.

Section 3.0, General Methodology Guidance for Resource Sections, provides the methodological framework common to the evaluation of all resource areas. Section 3.3, Air Quality and Global Climate Change, covers safety hazards from air emissions such as air toxics. Section 3.9, Geology, Soils, Seismicity, and Paleontology, addresses seismic and geotechnical hazards. Section 3.10, Hazardous Materials and Waste, addresses safety issues related to hazardous materials and waste from use or exposure to soil and groundwater contamination.

Section 3.19, Cumulative Impacts, provides the cumulative impact analysis methodology. Use Section 3.0, Section 3.19, and pertinent information from the sections above, in combination with this Safety and Security guidance section when developing the EIR/EIS analyses. The preparers of the safety and security section of an environmental document are responsible for following the program guidelines in the Authority's Safety and Security Management Plan.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the resource section. Example text that illustrates the concepts and methods is shown in *italics*. The methods are organized to mirror the organization of the EIR/EIS section or chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

If there is a discrepancy between the material in this guidance and any adopted federal and state agency guideline or manual applicable to Safety and Security, the agency guidance or manual controls. Identify and discuss any such discrepancies with the California High-Speed Rail Authority (Authority), Federal Railroad Administration (FRA) and the Program Management Team (PMT) before deviating from this guidance.

3.11.1 Introduction

The general method for preparing an introduction for this resource section is provided in Section 3.0.1, Introduction. The following discussion presents direction specific to Safety and Security.

The Introduction to the section provides an overview of the resource and any crucial issues or concerns relating to the resource area, preferably in a bullet or tabular format. The Introduction will present a list of the technical documents used to support the analysis and to prepare the impacts section, respectively. When the environmental document is released, all technical documents (e.g., technical appendices to the EIR/EIS, technical memoranda or reports) will be posted to the Authority website (see Authority website at: www.hsr.ca.gov/).

Refer specifically to related content in other sections of the EIR/EIS that influence or are influenced by the Safety and Security impact analysis (e.g., air quality and global climate change, geology, soils and seismicity, and hazardous materials and wastes) and supportive/associated technical documents. References to other documents must include citations to specific sections (by lowest heading tier, e.g., 3.X.X), not just a general reference to a chapter in the EIR/EIS.

3.11.2 Laws, Regulations, and Orders

Federal, state, and local laws, regulations, orders, or plans relevant to safety and security affected by the project are presented below. General National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) requirements for assessment and disclosure of

environmental impacts are described in Section 3.1, Introduction, and are therefore not restated in the resource section of the chapter.

3.11.2.1 Federal

FRA Procedures for Considering Environmental Impacts (64 FR 28545)

These FRA procedures state than an EIS should consider possible impacts on public safety.[1]

Rail Safety Improvement Act of 2008 (Public Law 110-432)

The Rail Safety Improvement Act reauthorized the FRA to oversee the nation's rail safety program. One aim of the statute is to improve conditions of rail bridges and tunnels. The Rail Safety Improvement Act also requires that railroads implement positive train control (PTC) systems by the end of 2015 on certain rail lines. PTC infrastructure consists of integrated command, control, communications, and information systems for controlling train movements that improve railroad safety by significantly reducing the probability of collisions between trains, casualties to roadway workers and damage to their equipment, and over-speed accidents. Federal Railroad Administration Regulations (49 C.F.R. Part 200-299).[2]

U.S. Code on Railroad Safety (49 U.S.C. § 20101 et seq.)

This code contains a series of statutory provisions affecting the safety of railroad operations.

Federal Railroad Administration – System Safety Program (49 CFR Part 270)

This regulatory program requires commuter and intercity passenger railroads to develop and implement a system safety program (SSP) to improve the safety of their operations. A SSP is a structured program with proactive processes and procedures, developed and implemented by railroads to identify and mitigate or eliminate hazards to reduce the number and rates of railroad accidents, incidents, injuries, and fatalities.

Department of Homeland Security/Transportation Security Administration (49 C.F.R. Part 1580)

This part codifies the Transportation Security Administration inspection program. It also includes security requirements for freight railroad carriers; intercity, commuter, and short-haul passenger train service providers; rail transit systems; and rail operations at certain fixed-site facilities that ship or receive specified hazardous materials by rail.

Transportation Security Administration—Security Directives for Passenger Rail

Security Directive RAILPAX-04-01 and RAILPAX-04-02 require rail transportation operators to implement certain protective measures, report potential threats and security concerns to the Transportation Security Administration, and designate a primary and alternate security coordinator.

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[1] On December 6, 2016, FRA published a Notice of Proposed Rulemaking (NPRM) proposing to amend its regulations on passenger equipment safety standards. See 81 Federal Register 8006. The NPRM addresses three major subject areas: (1) Tier III transit safety standards; (2) alternative crashworthiness and occupant protection performance requirements for Tier 1 passenger equipment; and (3 the maximum authorized sped for Tier III passenger equipment. These standards will not become effective unless FRA publishes a final rule

[2] The California High-Speed Rail Program is being required to employ an automatic train control (ATC) system. The ATC system shall provide functions of automatic train protection, automatic train operation, and automatic train supervision. The ATC system will include all the safety and non-safety critical functions of a train control system and will comply with FRA's positive train control requirements under both the federal Rail Safety Improvement Act of 2008 and 49 C.F.R. Part 236 Subpart I. A full description of the intended ATC system is provided in *Technical Memorandum 3.3., ATC Concept of System*, and *Technical Memorandum 3.3.2, ATC Site Requirements*.

Emergency Planning and Community Right-to-Know Act (42 C.F.R. Part 116)

The objectives of the Emergency Planning and Community Right-to-Know Act are to allow state and local planning for chemical emergencies, provide for notification of emergency releases of chemicals, and address a community's right-to-know about toxic and hazardous chemicals.

Federal Aviation Administration

Helicopter external lift operations are regulated under Title 14 CFR Part 133, Rotocraft External-Load Operations, and Section 133.33 Operation Rules. The FAA requires helicopter operators to submit an External Load Lift Plan to the agency for review and approval for public safety purposes prior to lifting external loads over or immediately adjacent to structures and/or roads. The plan would specify the following:

- Pilot qualifications and experience (pilots must be qualified in accordance with 14 CFR 133 for Class A and B, external load operations);
- Requirement for an aerial hazard analysis of the construction site;
- Protective clothing/equipment for ground personnel;
- Specifications for all rope used to suspend external loads;
- Specify responsibility for providing load calculations;
- Specify requirements for mission briefing prior to aerial operations;
- Safety considerations from Chapter 11 of the Interagency Helicopter Operations Guide (National Wildlife Coordination Group, 2016), adapted to meet the project's requirements; and,
- Emergency procedures in the event of a mechanical failure.

3.11.2.2 State

California Government Code Section 65302

California Government Code Section 65302 requires cities and counties to include in their general plan a statement of development policies setting forth objectives, principles, standards and plan proposals for seven policy areas, including safety. The safety element is to provide for the protection of the community from any unreasonable risks associated with seismic and geologic hazards, flooding, and wildland and urban fires. The element must also address evacuation routes, peak load water supply requirements, and minimum road widths and clearances around structures, as those items related to identified fire and geologic hazards.

California Public Utilities Code Section 765.5

Under California Public Utilities Code Section 765.5, the Commission is required to establish minimum inspection standards, to ensure that railroad locomotives, equipment, and facilities location in Class 1 railroad yards in California will be inspected not less frequently than every 120 days, and inspection of all branch and main line track not less frequently than every 12 months. The Commission is required to conduct focused inspections of railroad yards and track, either in coordination with the FRA or as the commission determines to be necessary. The focused inspection program shall target railroad yards and track that pose the greatest safety risk, based on inspection data, accident history, and rail traffic density.

California Public Utilities Code Section 768

Under California Public Utilities Code Section 768, the Commission may, after a hearing, require every public utility to construct, maintain, and operate its line, plant, system, equipment, apparatus, tracks, and premises in a manner so as to promote and safeguard the health and safety of its employees, passengers, customers, and the public. The Commission may prescribe,

among other things, the installation, use, maintenance, and operation of appropriate safety or other devices of appliances, including interlocking and other protective devices at grade crossings or junctions and block or other systems of signaling. The Commission may establish uniform or other standards of construction and equipment, and require the performance of any other act which the health or safety of its employees, passengers, customers, or the public may demand.

California Public Utilities Code Sections 309, 315, 765, 768, 7710 to 7727, 7661, and 7665 et seq.

The California Public Utilities Code Sections 7710 to 7727 cover railroad safety and emergency planning and response. Under this code, the Public Utilities Commission is required to adopt safety regulations and to report sites on railroad lines that are deemed hazardous within California. The Rail Accident Prevention and Response Fund was created in an effort to support prevention regulations financially through fees paid by surface transporters of hazardous materials. In addition, the Railroad Accident Prevention and Immediate Deployment Force was created to provide immediate onsite response in the event of a large-scale unauthorized release of hazardous materials. Modifications of existing highway-rail crossings require Commission authorization, and temporarily impaired clearance during construction requires application to the Commission and notice to railroads.

California Emergency Services Act (Cal. Gov. Code § 8550 et seq.)

The Emergency Services Act supports the state's responsibility to mitigate adverse effects of natural, human-produced, or war-caused emergencies that threaten human life, property, and environmental resources of the state. The act aims to protect human health and safety and to preserve the lives and property of the people of the state. The act provides the Office of Emergency Services with the authority to prescribe powers and duties supportive of the act's goals. In addition, the act authorizes the establishment of local organizations to carry out the provisions through necessary and proper actions.

California Public Resources Code Section 21096

The California Public Resources Code requires that the California Department of Transportation (Caltrans), Division of Aeronautics, Airport Land Use Planning Handbook (Caltrans 2002) be used as a technical resource to assist in the preparation of an EIR for any project situated within the boundaries of an airport land use compatibility plan. The Airport Land Use Planning Handbook supports the State Aeronautics Act (Cal. Public Res. Code § 21670 et seq.), providing compatibility planning guidance to airport land use commissions, their staffs and consultants, the counties and cities having jurisdiction over airport area land uses, and airport proprietors.

California Public Resources Code Section 21098

California Public Resources Code Section 21098 specifies notification procedures if a proposed project is located within a "low-level flight path" for aircraft that fly lower than 1,500 feet above the ground or a "military impact zone" within 2 miles of a military installation under the jurisdiction of the U.S. Department of Defense.

Gas Monitoring and Control at Active and Closed Disposal Sites (27 CCR 20917 et seq.)

The regulations within Article 6 set forth the performance standards and the minimum substantive requirements for landfill gas monitoring and control as it relates to active solid waste disposal sites and to proper closure, post closure maintenance, and ultimate reuse of solid waste disposal sites to ensure that public health and safety and the environment are protected from pollution due to the disposal of solid waste.

Power Line Safety and Fire Protection

California Code of Regulations, Title 14, Section 1250 "Fire Prevention Standards for Electric Utilities," specifies utility-related measures for fire prevention. It also provides specific exemptions from: electric pole and tower firebreak clearance standards, electric conductor clearance standards, and to specify when and where the standards apply.

California High-Speed Rail Program

Safety and Security Management Plan

Safety and security are priority considerations in the planning and execution of all work activities for the California High-Speed Rail Program. The system safety and system security program for the development and operation of high-speed rail is described in the Authority's Safety and Security Management Plan (SSMP). Based upon Federal Transit Administration guidelines for the safe and secure development of major capital projects, the SSMP includes the Authority's Safety and Security Policy Statement, roles and responsibilities for safety and security across the project, the program for managing safety hazards and security threats/vulnerabilities, safety and security certification program requirements, and construction safety and security requirements.

A hierarchy of controls shall be applied when considering the management of identified hazards:

1. Avoidance
2. Elimination
3. Substitution
4. Engineering controls
5. Warnings
6. Administrative controls
7. Personal protection equipment

The safety and security of high-speed rail (HSR) passengers, employees, and the surrounding communities are assured through the application of risk-based system safety and system security programs that identify, assess, avoid, and mitigate hazards and vulnerabilities for the HSR. Using domestic and international regulations, guidance, and industry best practices, the objective of the HSR system safety and system security programs is to ensure that risk-based hazard mitigation measures are adequately and consistently applied.

The HSR alignment will be fully access-controlled, meaning that the public will be able to access the system only at the station platforms. Access-control barriers and railway/roadway vehicle barriers along the right-of-way will prevent intrusion into the right-of-way.

HSR trains sets and fixed infrastructure will employ the latest safety features and designs to enable the trains to stay upright and in-line in the event of a derailment. Automatic train control systems will provide additional protections against collisions, derailments, outside hazards such as intrusions into the right-of-way, earthquakes, and severe weather conditions.

The HSR guideway, stations, and associated facilities will include fire and life-safety infrastructure (including fire and smoke prevention and control); security and communications systems; features to manage adjacent hazards from electrical and other utilities, hazardous materials facilities, oil and gas wells, and wind turbines.

Appropriate setbacks and access controls for adjacent facilities or underneath elevated structures, based upon existing regulations, guidance, or site-specific analysis, will ensure the safety and security of both the HSR operation and adjacent communities.

Technical Memorandum 2.8.1 Safety and Security Design Requirements for Infrastructure Elements

Technical Memorandum 2.8.1 identifies the safety and security requirements for infrastructure elements for the high-speed rail program. Key elements include:

- Safety and security design strategies to be employed
- Access/egress requirements for at-grade, raised, aerial, tunnel, and trench alignment configurations
- Fire and life-safety infrastructure for stations, tunnels, and support facilities including fire and smoke prevention and mitigation
- Access control and facility security requirements
- Adjacent hazard requirements including railroads, roadways, utilities, hazmat facilities, oil and gas wells, and wind turbines
- Other design requirements including intrusion protection strategies, utilities, third parties, electrical hazards, and communications

3.11.2.3 Regional and Local Regulatory Framework

Compile a complete inventory of adopted local and regional plans, ordinances, or guidelines related to safety and security. A tabular format similar to that used in the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014), or more recent HSR project EIR/EIS, may be used to organize and concisely report this information. This information will become part of Volume 2 Appendix 3.1-B Regional and Local Policy Inventory.

- General Plan Safety element
- Emergency plans that provide operating procedures for safety and security
- Other local policies and ordinances related to safety and security that include safety provisions in county codes, city municipal codes, city and county hazardous waste management plans, and police and fire department master plans
- Airport land use compatibility plans

Many state and local safety requirements refer to National Fire Protection Association (NFPA) Codes and Standards. The NFPA develops, publishes, and disseminates more than 300 codes and standards intended to minimize the possibility and effects of fire and other risks. *NFPA 130-2010: Standard for Fixed Guideway and Passenger Rail Systems* specifies guidance on incorporating passenger safety in system design; egress routes in the event of an emergency; emergency response planning, training, and operations; and fire and smoke prevention and suppression.

3.11.3 Regional and Local Policy Analysis

The overall structure of this discussion is presented in Section 3.0.3, Regional and Local Policy Analysis. As described in more detail in subsection 3.0.3.2, this analysis will describe any inconsistencies or conflicts with adopted regional or local policies and implementation of the HSR project.

3.11.4 Methods for Evaluating Impacts

Evaluation of impacts on safety and security is a requirement of NEPA, the California Public Utilities Code (Sections 309, 315, 765, 768, 7710 to 7727, 7661, and 7665 et seq.), and CEQA. List all the safety and security resources in the corridor as known based on resources identified in applicable planning documents, observed during field surveys, or defined by local sources. In addition, describe prior and on-going efforts to avoid impacts related to safety and security, including reference to impact avoidance and minimization features described in Section 2.5.2,

HSR Build Alternatives. Describe the methodology for developing the resource study area (RSA) and for evaluating effects under CEQA and NEPA. Subsequent sections in this guidance provide direction for the design of mitigation measures and the structure for presenting the content related to safety and security in the EIR/EIS documents.

3.11.4.1 Definition of Resource Study Area

The RSA is the area in which all environmental investigations specific to safety and security are conducted to determine the resource characteristics and potential impacts of the project segment. The factors making up the RSA and the description of the elements comprising the RSA are provided in the General Methodology Guidance.

The boundaries of the RSA for Safety and Security extend 0.5 mile immediately adjacent to the project footprint, including stations and maintenance facilities. The RSA for cumulative effects will be a broader area depending on the project section and will consider adjacent HSR project sections to ensure a broad consideration of impacts on a more regional and statewide basis. See Section 3.19, Methodology for Cumulative Impacts, for a more detailed discussion.

Table 3.11-1 presents the required information sources to help define the RSA.

The RSA for cumulative effects will be a broader area depending on the project section and will consider adjacent HSR project sections to ensure a broad consideration of impacts on a more regional and statewide basis. See Section 3.19, Methodology for Cumulative Impacts, for a more detailed discussion.

Table 3.11-1 Resource Study Area Information

Required Engineering Information	Resource Study Area
▪ Conceptual engineering plans and profiles ▪ Project description ▪ Safety and security plans that are developed as mitigation through the Hazard Management Program administered by the Authority	▪ Areas within the HSR right-of-way and 0.5 mile immediately adjacent to the construction footprint ▪ Station grounds and platforms ▪ Tunnels ▪ 0.5-mile radius around stations and maintenance facilities ▪ Possible indirect effects from the proposed project influencing an area larger than the direct impacts areas, including cities and counties ▪ Service boundaries for fire, law enforcement, and emergency services (e.g., fire departments, police departments, hospitals) that are not located in the study area but have boundaries in or provides services within the study area

3.11.4.2 Methodology for Impact Analysis

Group and consolidate information and discussion in the EIR/EIS to effectively present content to the lay audience (i.e., by distinct resource characteristic or component, such as safety and security impacts associated with project construction and operation). Include detailed information on safety and security data and airport obstructions as a result of the proposed HSR alternatives as a technical appendix in Volume 2 appendix of the EIR/EIS. Also include information on railroad modifications, crossings, and closures as a result of the proposed HSR alternatives in a Volume 2 appendix associated with this resource. Provide specific references to the appendices in the Safety and Security resources section of Chapter 3 to help the reader navigate between volumes. Prepare a detailed map of sufficient scale to illustrate the geographic relationship of the alternatives to safety and security. Do not allow the map boundary to exceed the extent of a project segment and clearly show the location and extent of project impacts and major landscape

features (e.g., highways, major roads, local jurisdictions, perennial water bodies, or other geographical landmarks or features that convey relative location and size). Obtain Authority, FRA, and PMT concurrence on mapping scale before preparing an administrative draft EIR/EIS.

Analyze direct and indirect impacts related to safety and security through quantitative analysis and, where necessary, with qualitative analysis following the hazard and vulnerability management processes identified in the Authority's SSMP. Analyze impacts that may occur during construction and operation of the HSR system (*note*: the analytical results for construction impacts and operations impacts are presented separately in the EIR/EIS). Apply the same impact thresholds in both project timelines. Use professional judgment when considering the context and intensity of an effect to determine the significance of impacts. Consider relevant aspects of context (e.g., existing resource conditions, resource sensitivity) and appropriate factors of intensity (e.g., extent of change, duration of change) for determining impact significance. Also consider project actions that improve or otherwise benefit resource values in the evaluation of impact significance.

Apply the hierarchy of controls identified in the SSMP (and included in Section 3.11.2.2) when considering avoidance and minimization features that are incorporated into the project in Section 2.5.2, HSR Build Alternatives, evaluated in Volume 2, Appendix 2-E. Account for implementation of the design features or best management practices, such as compliance with established safety and security design and engineering standards promulgated by federal and state agencies, private organizations (AASHTO/AREMA), and the Authority[3] that are intended to minimize or avoid the types of impacts being evaluated in this chapter. Refer to the summary table of impact avoidance and minimization features and explain how particular design features avoid impacts or ensure that they are less than significant impacts to safety and security.

Base the analysis on a review of available reports and data (including federal and state statutes, resource agency, local, and regional agency policies and ordinances), discussions with agency representatives in the region and at the Program-level, field investigation, modeling (where applicable), and professional judgment. Some types of localized information will not be in published reports and may be obtainable only by conferring with local agency representatives. The methodology used to evaluate safety and security impacts is generally based on the *Rail Safety Improvement Act of 2008* (www.fra.dot.gov/Page/P0395), *FRA Regulations under 49 CFR Volume 4, Chapter 2* (www.law.cornell.edu/cfr/text/49/chapter-II), and *Transportation Security Administration Security Directives for Passenger Rail* (www.tsa.gov/stakeholders/mass-transit). Include a review of the data and impact analyses in the other sections prepared for the EIR/EIS, including air quality and global climate change, geology, soils, and seismicity, and hazardous materials and waste. Table 3.11-2 identifies sources and types of construction and operation impacts.

Consider the exposure of HSR system passengers and employees or structures to significant risk of loss, injury, or death during construction and operation of the project. Because no HSR system currently operates in the U.S., the evaluation of safety and security impacts is based on (1) international rail operating experience and (2) existing conditions compared to the design and operational features of the HSR alternatives.

For safety, address future rail system operations, such as the following:

- Train operations
- Infrastructure maintenance

[3] In particular, review design requirements specified under PMT Technical Memorandum 2.1.7, "Rolling Stock and Vehicle Intrusion Protection for High-Speed Rail and Adjacent Transportation Systems," Technical Memorandum 2.8.1, "Safety and Security Design Requirements for Infrastructure Elements," Technical Memorandum 2.8.2, "Access Control for High-Speed Right-of-Way and Facilities," and a "Risk Assessment for Elevated Right-of-Way, Threat and Vulnerability Assessment and Preliminary Hazard Analysis."

- Vehicle, bicycle, and pedestrian access control measures at stations and along the right-of-way
- Emergency response strategies and capabilities by fire, law enforcement, and emergency services to fire, seismic events, or other emergency situations

For security, evaluate impacts associated with

- The incidence of criminal activities impacting passengers and employees and HSR infrastructure
- Attractiveness and vulnerability of the HSR for terrorist activity

Table 3.11-2 Source and Description of Potential Safety and Security Impacts

Source of Impacts	Description of Impacts
Construction activities with potential for impacts to safety and security resources due to temporary or permanent physical change on the landscape by project facilities such as the guideway and supporting structures, HSR-related infrastructure and facilities, stations, parking structures/lots	▪ Accidents at construction sites ▪ Accidents associated with construction-related detours or other traffic-control measures ▪ Crime at construction sites ▪ Increased response times for fire, rescue, and emergency services from temporary or permanent road closures
Operational impacts resulting from ongoing rail service and maintenance activities of the HSR system * *List includes areas that should be discussed in the text of the EIR/EIS chapter, but is not intended to suggest that each area represents a significant impact. Safety features of the high-speed rail system will avoid many impacts	▪ Train-to-train collisions ▪ Collisions with other trains entering the HSR corridor ▪ Train derailment ▪ Motor vehicle, pedestrian, and bicycle accidents associated with HSR operations, including at stations, parking structures and maintenance facilities ▪ HSR accidents associated with extreme weather conditions such as flooding and high winds ▪ HSR accidents associated with seismic events ▪ On-board fire ▪ Tunnel fires ▪ Accident risks to airports, private airstrips, and heliports ▪ Hazards to the HSR from nearby facilities (e.g., nearby industrial facilities) ▪ Safety impacts to residences ▪ Safety impacts to schools ▪ Criminal or terrorist activity aboard trains, at stations, along the right-of-way and at facilities ▪ Increased/decreased response times for fire, rescue, and emergency services associated with the HSR alignment and road modifications/ closures ▪ Emergency capabilities for response to mass casualty events or to HSR alignment types such as elevated and trench structures or tunnels ▪ Safety and security setback requirements from the HSR alignment and adjacent facilities and underneath elevated structures

3.11.4.3 Method for Determining Significance under NEPA

NEPA does not specify thresholds for determining the significance of an impact to safety and security, as described in more detail in Section 3.0.4.3. For the purposes of the Project EIR/EIS document, the evaluation of NEPA impact significance does not use intensity thresholds. Use professional judgment when considering the resource context, intensity, and duration of the potential effect to determine whether an impact is significant or less than significant.

3.11.4.4 Method for Determining Significance under CEQA

CEQA requires identifying the significant effects on the environment of a project and indicating the manner in which the significant effects can be mitigated or avoided. Significant impacts are determined by evaluating whether project impacts would exceed the significance thresholds established for the resource. A significant safety or security impact could occur if a project would:

- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the safety or security of such facilities
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses
- Result in a safety hazard for people residing or working in the project vicinity (for a project located within an area where there is an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport or within the vicinity of a private airstrip)
- Result in substantial adverse physical impacts associated with the provision of and the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services, including fire protection, police protection, and emergency services
- Result in inadequate emergency access
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan
- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands

3.11.5 Affected Environment

Include a concise summary description of existing emergency services, law enforcement, emergency medical services, emergency response plans, and community safety features, such as vehicular safety, rail and airports, pedestrian and bicycle safety, schools, and the identification of high-risk facilities and fall hazards (e.g., high-pressure pipe lines, fuel storage tanks, vertical storage silos and refinery distillation columns) along the proposed HSR alignments and at proposed HSR facilities. In particular:

- Identify the location of government facilities, hospitals, and where public services are provided (e.g., fire and police stations, sheriff department). A map may be created to illustrate the locations of government facilities (city hall, courthouse, jail, post office, library), hospitals, fire and police stations, sheriff department, alternatives, and proposed mitigation measures.
- Document established local policies concerning the provision of emergency services, law enforcement, emergency medical services, and emergency response planning.
- Describe pertinent stakeholder issues and concerns from public outreach efforts.

- Cross-reference all sections of the EIR/EIS (by lowest heading tier, e.g., 3.X.X) that describe the resources or are related to safety and security resources (e.g., Air Quality and Global Climate Change; Geology, Soils, and Seismicity; and Hazardous Materials and Waste).

The following sections provide key information needed for a complete description of the affected environment and typical sources for the information.

3.11.5.1 Safety and Security Plans and Procedures

Table 3.11-3 provides key information needed to identify existing policy and procedures related to safety and security and typical sources for the information.

Table 3.11-3 Key Information and Sources for Plans and Procedures

Key Information	Sources of Information
▪ Applicable policy and plans ▪ Emergency plans ▪ Evacuation routes ▪ Safety and security procedures ▪ Hazardous waste management plans	▪ Safety, security or emergency management element included in general plans ▪ Applicable county and municipal codes and ordinances ▪ Adopted county and city safety and security operating procedures ▪ Emergency service and operation plans ▪ Airport plans ▪ National Fire Protection Association Codes and Standards ▪ Police and fire mutual aid agreements

3.11.5.2 Emergency Services

Emergency Services along the HSR Right-of-Way

The HSR right-of-way will be located in both urban and rural areas. Emergency response capabilities, response times, and right-of-way access will all be keys to successful response in the event of an accident or incident requiring emergency response. Resources such as water supply, roadway, communications, and emergency transportation should be considered, as well.

Table 3.11-4 identifies the key information needed for describing site-specific conditions related to fire, law enforcement, and emergency medical services along the HSR right-of-way for the project alignment alternatives.

Table 3.11-4 Key Information and Sources for Emergency Services along the HSR Right-of-Way

Key Information	Sources of Information
▪ Locations and service areas of fire and police emergency services ▪ Locations of hospitals and other emergency service providers ▪ Emergency equipment access provisions (i.e., fire truck access) and any special emergency equipment needs ▪ Available resources such as water, power, and communications ▪ Emergency and safety plans and local policies regarding ambulance, fire, police, and rescue services dispatching procedures and ideal response times	▪ Interviews with local fire, police jurisdictions, hospitals, and other emergency service providers ▪ Local transit providers emergency and safety plans

Emergency Services at Fixed Facilities

Safety and security conditions at the proposed station, traction power substation, maintenance of infrastructure, heavy maintenance facility (HMF), and other fixed facility sites are different from those safety and security conditions for the HSR right-of-way along the project alignment alternatives. Table 3.11-5 identifies the key information needed for describing site-specific conditions related to fire, law enforcement, and emergency medical services at the fixed facilities.

Table 3.11-5 Key Information and Sources at Fixed Facilities

Key Information	Sources of Information
▪ Locations and service areas of fire and police emergency services ▪ Locations of hospitals and other emergency service providers ▪ Emergency equipment access provisions (i.e., fire truck access) and any special emergency equipment needs ▪ Emergency and safety plans and local policies regarding ambulance, fire, police, and rescue services dispatching procedures and ideal response times	▪ Interviews with local fire, police jurisdictions, hospitals, and other emergency service providers ▪ Local transit providers emergency and safety plans

3.11.5.3 Community Safety

Table 3.11-6 through Table 3.11-12 describe information needed for characterizing the affected environment with respect to vehicular safety, rail and airports, pedestrian and bicycle safety, schools, high-risk facilities and fall hazards, and sources for that information.

Table 3.11-6 Key Information and Sources for Vehicular Safety

Key Information	Sources of Information
▪ Existing vehicular traffic conditions around proposed stations and facilities, including congestion, accident patterns, and station accessibility concerns (cross-reference *Traffic, Transit, Circulation, Parking, and Freight Rail Report*) ▪ Vehicular accidents, if a concern in the RSA, and common factors contributing to vehicular accidents ▪ Traffic accident and congestion statistics within the cities in the RSA	▪ Interviews with local jurisdiction planning agencies ▪ California Highway Patrol Statewide Integrated Traffic Records System

Table 3.11-7 Key Information and Sources for Train Passenger/Employee Safety and Security

Key Information	Sources of Information
▪ Major passenger safety issues in rail cars and known safety hazards ▪ Major system safety risks ▪ Emergency equipment access provisions (e.g., fire truck access) and any special emergency equipment needs ▪ Issues with the construction of the rail vehicle ▪ Security vulnerabilities in rail vehicles	▪ Accident statistics reports and rail car maintenance reports ▪ Safety and Security Certification Program (SSCP) to be developed during preliminary engineering and updated throughout the project phases as necessary ▪ Preliminary Hazard Analysis (PHA) to be developed during the preliminary engineering phase of the project ▪ Threat and Vulnerability Assessment (TVA) to be developed during the preliminary engineering phase of the project ▪ Rail Vehicle PHA to be developed during the preliminary engineering phase of the project ▪ Interviews with local fire and police jurisdictions, hospitals, and other emergency service providers

Table 3.11-8 Key Information and Sources for Platform/Station Safety

Key Information	Sources of Information
▪ Platform or station safety issues, including accident or injury risks and identified safety hazards ▪ Criminal or terrorist risks at station locations and parking facilities ▪ Emergency equipment access provisions (i.e., fire truck access) and any special emergency equipment needs	▪ PHA and TVA to be developed during the preliminary engineering phase of the project ▪ SSCP to be developed during preliminary engineering and updated throughout the project phases as necessary ▪ Crime statistics for surrounding area (National Uniform Crime Reporting Program) ▪ Interviews with local fire and police jurisdictions, hospitals, and other emergency service providers

Table 3.11-9 Key Information and Sources for Airports

Key Information	Sources of Information
▪ Public airports, public use airports, and private airstrips within the RSA and the project vicinity ▪ Major passenger safety issues in airport(s) (including flight and landing paths, control tower and terminals, and hangar buildings) and known safety hazards ▪ Major system safety risks ▪ Emergency equipment access provisions (e.g., fire truck access) and any special emergency equipment needs ▪ Issues with the construction of the HSR	▪ Airport master plans ▪ Accident statistics reports and maintenance reports for airports ▪ Information from military installations located within a "low-level flight path" or a military impact zone near the HSR, as defined under CPRC 21098 ▪ SSCP to be developed during preliminary engineering and updated throughout the project phases as necessary ▪ PHA to be developed during the preliminary engineering phase of the project ▪ TVA to be developed during the preliminary engineering phase of the project ▪ Rail Vehicle PHA to be developed during the preliminary engineering phase of the project ▪ Interviews with local fire and police jurisdictions, hospitals, and other emergency service providers

Table 3.11-10 Key Information and Sources for Pedestrian and Bicycle Safety

Key Information	Sources of Information
▪ Existing pedestrian traffic conditions around proposed stations and facilities, including problems, patterns, and accessibility concerns (cross-reference *Traffic, Transit, Circulation, Parking, and Freight Rail Report*) ▪ Pedestrian accidents, if a concern in the RSA, and factors contributing to pedestrian accidents ▪ Present and future local pedestrian safety initiatives within RSA ▪ Existing and proposed Americans with Disabilities Act conditions around proposed stations and facilities, including problems, patterns, and accessibility concerns ▪ Existing bicycle traffic conditions around proposed stations and facilities, including problems, patterns, and accessibility concerns and designated bike routes and lanes in area surrounding station locations (cross-reference *Traffic, Transit, Circulation, Parking, and Freight Rail Report*) ▪ Cyclist accidents, if a concern in the RSA, and factors contributing to cyclist accidents ▪ Present and future local cyclist safety initiatives within the RSA	▪ Interviews with local jurisdiction planning agencies ▪ California State Office of Traffic Safety ▪ Local schools and area school districts, including safe routes to schools, plans, and policies ▪ Local and regional pedestrian and disability advocacy groups ▪ Crash analysis and crash statistics from the *Traffic, Transit, Circulation, Parking, and Freight Rail Report* ▪ Interviews with local jurisdiction planning agencies ▪ California State Office of Traffic Safety ▪ Local schools and area school districts ▪ Local and regional cycling advocacy and commuter groups

Table 3.11-11 Key Information and Sources for Schools

Key Information	Sources of Information
Locations of schools within 0.25 mile of the project footprint for an alignment alternative, or other project component	Interviews with local school district or school officials to identify the existence of emergency response and evacuation safety plans

Table 3.11-12 Key Information and Sources for High-Risk Facilities and Fall Hazards

Key Information	Sources of Information
High-risk facilities (such as refineries, chemical plants and oil wells/fields) and fall hazards (such as industrial facilities with tall structures such as silos, distillation columns and wind turbines) that exist within two miles of the HSR and could pose threats to operation of the project in the event of a hazardous release, structural failure or other incident at those facilities	▪ Interviews with local fire and police jurisdictions, hospitals, and other emergency service providers ▪ Interviews with local hazardous materials regulators and review of applicable hazardous materials business plans. ▪ Interviews with private operators and state regulatory officials (e.g., CA Office of State Fire Marshal, CA Office of Emergency Services, Department of Conservation, Division of Oil, Gas and Geothermal Resources)

3.11.5.4 Wildland Fires

Table 3.11-13 provides key information needed for characterizing the affected environment with respect to wildland fires and sources for that information.

Table 3.11-13 Key Information and Sources for Wildland Fires

Key Information	Sources of Information
▪ Location of wildlands within the regional setting ▪ History of or potential for wildland fires within the RSA	▪ Wildlands and fire records/potential ▪ Biological Resources and Wetlands Report ▪ Consultation with fire departments ▪ California Department of Forestry and Fire Protection records ▪ Interviews with County or Regional fire protection districts

3.11.5.5 Security

Table 3.11-14 provides key information needed for characterizing the affected environment with respect to security and sources for that information. Security-sensitive information cannot be publicly distributed. Confirm content suitable for publication as part of Authority and FRA review of each administrative draft EIR/EIS.

Table 3.11-14 Key Information and Sources for Security

Key Information	Sources of Information
▪ General description of security and law enforcement services in areas planned for HSR service, stations, parking areas, and facilities ▪ Emergency lockdown or evacuation and emergency communication plans ▪ Airports and private airstrips within 2 miles of the project area – Summary of adopted airport land use plans, with focus on potential hazards to people residing or working within the project area – Identification and summary of emergency response plans and emergency evacuation plans within the project area ▪ Likely high concentrations of population or important federal and state centers in the project area ▪ High-risk facilities (e.g., refineries, chemical plants) within 2 miles of the project footprint ▪ Access points to right-of-way HSR infrastructure and equipment, particularly in remote areas ▪ Crime statistics in areas planned for HSR service corridors, corridors, stations, and facilities ▪ High profile terrorist targets and critical infrastructure adjacent to HSR service corridors, stations, and facilities ▪ Existing criminal laws that would pertain to criminal acts on HSR property (e.g., trespass, criminal mischief/vandalism, sabotage)	▪ Interviews with county and local law enforcement services – This may include services already provided at stations where the HSR will coexist with other transit agencies ▪ Safety and Security Certification Program to be developed during the preliminary engineering phase of the project ▪ Federal Bureau of Investigation Data Base ▪ Department of Homeland Security preparedness information ▪ Local transit providers emergency and safety plans – Airport and airstrip locations: maps of project area – Airport Land Use Plans: airport operators or authorities; municipal airport or aviation departments – Emergency plans: fire departments; county or municipal emergency planning departments

3.11.5.6 Active and Closed Landfills

Table 3.11-15 provides key information needed for characterizing the affected environment with respect to landfills and sources for that information.

Table 3.11-15 Key Information and Sources for Landfills

Key Information	Sources of Information
Potential for a change in land use adjacent to landfills, consistent with Title 27 of the California Code of Regulations, to assess landfill potential to release methane gas which may present an explosion risk	▪ Hazardous and Hazardous Materials Technical Report for the HSR section ▪ California Code of Regulations, Title 27, Division 2, Chapter 3, Subchapter 4, Gas Monitoring and Control at Active and Closed Disposal Sites

3.11.6 Environmental Consequences

General formatting and terminology for constructing the discussion of environmental consequences is provided in Section 3.0.6, Environmental Consequences. The following direction is specific for the evaluation of safety and security. Also see the *Fresno to Bakersfield Section Final EIR/EIS*, or more recent HSR project EIR/EIS, for example discussions of safety and security. The heading structure for the Safety and Security EIR/EIS discussion is shown in Section 3.11.11.

Give each impact a short description and number, e.g., *S&S Impact #1*: *The temporary closure of roadways during project construction would result in increased response time for emergency personnel.* Explain the results of the analysis prescribed in Section 3.11.4. Simplify impact discussions whenever possible with references or citations to the more detailed information in the appendices. Use tables whenever possible to summarize the impacts and simplify the text.

The NEPA and CEQA assessments shall reach specific, separate conclusions about significance for each impact based on the significance criteria and methods defined in the NEPA and CEQA subsections of Section 3.11.4. For example:

> *Road closures and modified traffic routing along HSR tracks could result in increased response times for emergency responders that exceed acceptable response times. As discussed in Section 3.2, Transportation, existing roads would either remain unchanged where elevated tracks would cross them or would be modified into overcrossings or undercrossings where at-grade track would conflict with them. Road segments that would permanently be closed are typically short (less than 1 mile), and access to properties adjacent to these closed roads would be readily available from other roads. Road crossings in rural areas would occur approximately every 2 miles. Section 3.2.6, Environmental Consequences, states that limited traffic impacts are expected as a result of the closures and diversions of traffic. Because the project design would include coordination with emergency responders to incorporate roadway modifications that maintain existing traffic patterns and fulfill response route needs, effects on the response times by service providers would be less than significant under both NEPA and CEQA.*

Table 3.11-16 identifies topics and issues to be evaluated in this section.

Table 3.11-16 Topics and Safety and Security Issues to Evaluate

Topic	Issues to Evaluate
Construction safety and security	▪ Exposure of workers and others to hazards not addressed in standard safety procedures ▪ Potential for additional highway-rail crossings resulting from project or inadequate non-motorized connections ▪ Potential for temporary or permanent removal of established safety features
Operational safety	▪ Exposure of workers and passengers to hazards not addressed in California High-Speed Rail system standard safety procedures ▪ Hazards to the HSR from nearby facilities ▪ Safety impacts to residences, schools, and other adjacent facilities ▪ Safety impacts to schools
Motor vehicle, pedestrian, and cyclist accidents	▪ Potential for dangerous conditions around the HSR alignment, stations, and facilities that could lead to an increase in vehicle, pedestrian or cyclist accidents
Security	▪ Potential for vulnerabilities related to terrorist acts ▪ Potential for vulnerabilities to criminal activity aboard trains and at stations ▪ Potential for vulnerabilities to criminal activities at or near stations and platforms ▪ Issues identified in the Threat and Vulnerability Assessment
Emergency response	▪ Emergency access and response to the HSR right-of-way for accidents or incidents resulting in injury or death ▪ Emergency right-of-way access by outside medical personnel ▪ Increase in demand for emergency response that could result in a need for new or altered facilities in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services, including fire protection, police protection, and emergency services
Hazards associated within airports or airstrips	▪ Proximity of project alternatives to public airports, public use airports, and private airstrips ▪ Airports with airport land use plans – Review project alternatives design and operation characteristics against adopted airport land use plans to determine whether hazards would be created such as proximity or height of proposed facilities in relation to airport surfaces and airspace. – Also consider characteristics such as lighting hazardous to aircraft operations and hazardous materials use by airports or in proximity to airports. ▪ Airports and airstrips without airport land use plans – Review project alternatives design and operation characteristics against Federal Aviation Administration airport planning criteria and Caltrans Division of Aeronautics land use guidance to determine whether hazards would be created such as proximity or height of proposed facilities in relation to airport surfaces and airspace. – Also consider characteristics such as lighting hazardous to aircraft operations and hazardous materials use by airports or in proximity to airports and airstrips. ▪ Potential safety hazard for people residing or working in the RSA where a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport ▪ Potential safety hazard for people residing or working in the RSA where a project is within the vicinity of a private airstrip

Table 3.11-16 Topics and Safety and Security Issues to Evaluate (continued)

Topic	Issues to Evaluate
Wildland fire hazards	▪ Potential of increase in wildland fire hazards due to project alternative features such as power lines and facilities or storage and maintenance facilities ▪ Exposure of potential hazard to people (including passengers and employees) or structures from wildland fires due to changes in proximity, construction, and operations of project alternatives ▪ Exposure of people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands
Land uses adjacent to active and closed landfills	Potential for a change in land use adjacent to landfills, consistent with Title 27 of the California Code of Regulations, to assess landfill potential to release methane gas which may present an explosion risk

3.11.7 Mitigation Measures

General formatting and terminology for constructing the discussion of mitigation measures is provided in Section 3.0.7, Mitigation Measures. The following direction is specific to safety and security resources. Present the mitigation measures associated with the project alternatives within each geographic segment under the subheadings of Construction Measures and Operations Measures. Organizing impacts by these two general periods of project implementation will help explain when impacts are expected to occur. The heading structure for this organization scheme is shown in Section 3.11.11. Give each mitigation measure a short descriptive title and a number, such as *S&S-MM #1,* that corresponds to the primary significant impact for which the measure is proposed (if practical).

Develop project-level measures that are consistent with adopted program and project strategies that avoid or minimize impacts. Begin by considering programmatic mitigation strategies described in Section 3.0.7 and the safety and security-related environmental document sections in the most recent environmental documents produced by the Authority (e.g., *Fresno to Bakersfield Section Final EIR/EIS*, or more recent HSR project EIR/EIS), as applicable to the HSR project section.

Design mitigation measures to address any significant safety and security effects. If specific mitigation measures cannot be formulated with precision (i.e., the precise measure(s) in a precise location with precise features), identify performance standards. At a minimum, performance standards should include quantitative, qualitative, and location criteria, to ensure the mitigation measure can be implemented and effectively reduce the impacts to a less-than-significant level. Deferred mitigation measure are only acceptable where there are measurable performance criteria, there is a specified time or action trigger for performance, and the Authority commits to implement them. In the instance where mitigation measures would be implemented by another entity, such as a local jurisdiction or other agency that is not within the purview of the Authority, implementation cannot be guaranteed and the impact would therefore remain significant and unavoidable.

Draft the mitigation measures to facilitate transition into the Mitigation Monitoring and Enforcement Plan by clearly identifying responsibility and timing for implementation, as appropriate. For example:

> *The Authority will monitor response of local fire, rescue and emergency service providers to incidents at stations and the HMF and provide a fair share of cost of service. Upon approval of the Fresno to Bakersfield HSR Section, the Authority will monitor service levels in the vicinity of the Fresno, Kings/Tulare, and*

Bakersfield stations and, at such time as an HMF site is selected, monitor service levees at the HMF site, to determine baseline service demands. "Service levels" consist of the monthly volume of calls for fire and police protection, as well as city- or fire protection district-funded emergency medical technician/ambulance calls that occur in the station and HMF site service areas.

Prior to operation of the stations for HSR service, the Authority will enter into an agreement with the public service providers of fire, police, and emergency services to fund the Authority's fair share of services above the average baseline service demand level for the station and HMF service areas (as established during the monitoring period). The fair share will be based on projected passenger use for the first year of operations, with a growth factor for the first 5 years of operation. This cost sharing agreement will include provisions for ongoing monitoring and future negotiated amendments as the stations are expanded or passenger use increases. Such amendments will be made on a regular basis for the first 5 years of station operation, as will be provided in the agreement. To make sure that services are made available, impact fees will not constitute the sole funding mechanism, although impact fees may be used for fund capital improvements or fixtures (i.e., police substation, additional fire vehicle, on-site defibrillators, etc.) necessary to service delivery.

After the first 5 years of operation, the Authority will enter into a new or revised agreement with the public service providers of fire, police, and emergency services to fund the Authority's fair share of services. The fair share will take into account the volume of ridership, past record and trends in service demand at the stations and HMF site, new local revenues derived from station area development, and any services that the Authority may be providing at the station.

3.11.8 Impacts from Implementing Mitigation Measures

General guidance for constructing the discussion of impacts from implementing mitigation measures is provided in Section 3.0.8, Impacts from Implementing Mitigation Measures.

Consider and disclose both positive and negative impacts of mitigation measures as part of the environmental analysis. For example, *creating a new downtown rail station and introducing new passengers into cities could result in a need to expand existing fire, rescue, and emergency services, while at the same time increasing economic activity around stations resulting in higher property and sales tax revenues to help offset costs of additional service demand*.

Make reasonable assumptions about the potential amount and type of potential safety or security impacts, such as changes in emergency services response times; needs for relocated, new, or expanded facilities; shifts in transportation patterns or needs; or changes in other supportive infrastructure (may be positive or negative). Evaluate all mitigation measures, including off-site measures, using the methods in Section 3.11.4. Determine probable impacts using actual, on-the-ground analysis and describe the substantial basis for analytical conclusions (including defined thresholds or other criteria). When the impacts of mitigation measures cannot be quantified (e.g., at a specific location, in a definite extent, at a particular time or duration, or measurable alteration of the affected resource), evaluate potential impacts using clearly described assumptions based upon reasonably foreseeable outcomes.

3.11.9 Impacts Summary

3.11.9.1 NEPA Impacts

The overall structure and content of this section is presented in Section 3.0.9.1, NEPA Impacts. The heading structure for this organizational scheme is shown in Section 3.11.11. Use maps, as appropriate, to show locations of significant impacts of alternatives by segment.

3.11.9.2 CEQA Significance Conclusions

The overall structure and content of this section is presented in Section 3.0.9.2, CEQA Significance Conclusions. The heading structure for this organizational scheme is shown in Section 3.11.11. Use maps, as appropriate, to show locations of significant unavoidable impacts of alternatives by segment. Explain the reason why any mitigation measure will reduce the impacts of special impacts and conclude what the level of significance is after mitigation. The reason for the reduction or avoidance of any impact should be directly related to the thresholds of significance.

3.11.10 Products

The RC is responsible for preparing the following products, under Authority and FRA direction, according to PMT guidance and subject to PMT quality control and assurance.

3.11.10.1 Technical Report or Appendix

In addition to the Volume 1 impacts analysis chapter, provide technical reports or Volume 2 appendices where full analysis applicable to the HSR project section requires details in excess of efficient inclusion in the EIR/EIS Volume 1. For example:

1. Volume 2, Appendix 2-E, Project Impact Avoidance and Minimization Features Analysis
2. Volume 2, Appendix 3.1-B, Regional and Local Policy Inventory
3. Volume 2, Appendix 3.11-A, Safety and Security Data
4. Volume 2, Appendix 3.11-B, Existing and Proposed Railroad Crossings
5. Volume 2, Appendix 3.11-C, Airport Obstructions

3.11.10.2 Project EIR/EIS Volume 1

1. Summary/Table for EIR/EIS Executive Summary
2. Project Description—Safety and Security-related Components
   a. Impact Avoidance and Minimization Features
   b. Summary Table of Impact Avoidance and Minimization Features, and Project Impacts
3. Affected Environment, Environmental Consequences and Mitigation Measures Section: Safety and Security
4. Affected Environment, Environmental Consequences and Mitigation Measures Section 3.19: Cumulative Impacts

3.11.11 Safety and Security EIR/EIS Outline

The RC will use the following outline for organizing content related to the safety and security resources in Chapter 3 of the project EIR/EIS, using the heading hierarchy and format as indicated. The RC will consider the impacts of implementing mitigation measures in Section 3.11.1.

3.11 Safety and Security
- 3.11.1 Introduction
- 3.11.2 Laws, Regulations, and Orders
  - 3.11.2.1 Federal
  - 3.11.2.2 State
  - 3.11.2.3 Regional and Local

3.11.3 Regional and Local Policy Analysis
3.11.4 Methods for Evaluating Impacts
- 3.11.4.1 Definition of the Resource Study Area (RSA)
- 3.11.4.2 Method for Determining Significance under NEPA
- 3.11.4.3 Method for Determining Significance under CEQA

3.11.5 Affected Environment
- 3.11.5.1 Project Segment 1
  - Alternative 1
  - Alternative 2
  - Alternative 3
  - Alternative N
- 3.11.5.2 Project Segment 2
  - Alternative 1
  - Alternative 2
  - Alternative 3
  - Alternative N
- 3.11.5.3 Project Segment 3
  - Alternative 1
  - Alternative 2
  - Alternative 3
  - Alternative N
- 3.11.5.4 Project Segment N
  - Alternative 1
  - Alternative 2
  - Alternative 3
  - Alternative N

3.11.6 Environmental Consequences
- 3.11.6.1 Overview
- 3.11.6.2 Project Segment 1
  - No Project
  - Alternative 1
    - Construction Impacts
    - Operations Impacts
  - Alternative 2
    - Construction Impacts
    - Operations Impacts
  - Alternative 3
    - Construction Impacts
    - Operations Impacts
  - Alternative N
    - Construction Impacts
    - Operations Impacts
- 3.11.6.3 Project Segment 2
  - No Project
  - Alternative 1
    - Construction Impacts
    - Operations Impacts
  - Alternative 2
    - Construction Impacts
    - Operations Impacts
  - Alternative 3
    - Construction Impacts
    - Operations Impacts

Alternative N
Construction Impacts
Operations Impacts
3.11.6.4 Project Segment 3
No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.11.6.5 Project Segment N
No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.11.7 Mitigation Measures
3.11.7.1 Project Segment 1
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.11.7.2 Project Segment 2
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures

Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.11.7.3 Project Segment 3
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.11.7.4 Project Segment N
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.11.8 NEPA Impact Summary
3.11.8.1 Alternative 1
Construction Impacts
Operations Impacts
3.11.8.2 Alternative 2
Construction Impacts
Operations Impacts
3.11.8.3 Alternative 3
Construction Impacts
Operations Impacts
3.11.8.4 Alternative N
Construction Impacts
Operations Impacts
3.11.9 CEQA Significance Conclusions
3.11.9.11 Alternative 1
Construction Impacts
Operations Impacts
3.11.9.2 Alternative 2
Construction Impacts
Operations Impacts

3.11.9.3 Alternative 3

Construction Impacts

Operations Impacts

3.11.9.4 Alternative N

Construction Impacts

Operations Impacts

3.12 Socioeconomics and Communities

The methodology guidelines in this section are organized by a sequence of steps for preparing an environmental document. Section 3.12.11 provides an outline for this environmental impact report/environmental impact statement (EIR/EIS) section.

Section 3.0, General Methodology Guidance for Resource Sections, provides the methodological framework common to the evaluation of all resource areas. Section 3.19, Cumulative Impacts, provides the cumulative impact analysis methodology. Use Section 3.0 and Section 3.19 in combination with this guidance section when developing the EIR/EIS analyses.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the resource section. Example text that illustrates the concepts and methods is shown in *italics*. The methods are organized to mirror the organization of the EIR/EIS section or chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

If there is a discrepancy between the material in this guidance and any adopted federal or state agency guideline or manual applicable to socioeconomics and communities, the agency guideline and manual controls. Identify and discuss any such discrepancy with the California High-Speed Rail Authority (Authority), Federal Railroad Administration (FRA) and the Program Management Team (PMT) before deviating from these guidelines.

3.12.1 Introduction

The general method for preparing an introduction for this resource section is provided in Section 3.0.1, Introduction. The following direction is specific to the evaluation of Socioeconomics and Communities.

Refer to related content in other sections of the EIR/EIS that influence or are influenced by the Socioeconomics and Communities impact analysis (e.g., agricultural lands, regional growth, environmental justice, cumulative) and supportive/associated technical documents, such as the Community Impact Assessment Technical Report (CIA). References to other documents must include citations to specific sections (by lowest heading tier, e.g., 3.X.X), not just a general reference to a chapter or section in EIR/EIS.

3.12.2 Laws, Regulations, and Orders

Federal, state, and local laws, regulations, orders or plans relevant to socioeconomics and communities affected by the project are presented below. General National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) requirements for assessment and disclosure of environmental impacts are described in Section 3.1, Introduction, and therefore not restated in the resource section of the chapter.

3.12.2.1 Federal

Procedures for Considering Environmental Impacts (64 Fed. Reg. 28545)

The FRA Procedures for Considering Environmental Impacts Section 14(n)(14) requires an Environmental Impact Statement to assess the impacts of the alternatives on the transportation and general mobility of the elderly and handicapped.

Improving Access to Services for Persons with Limited English Proficiency (USEO 13166)

U.S. Presidential Executive Order (USEO) 13166 requires each federal agency to ensure that recipients of federal financial assistance provide meaningful access to their programs and activities by Limited English Proficiency (LEP) applicants and beneficiaries.

Protection of Children from Environmental Health Risks and Safety Risks (USEO 13045)

USEO 13045 requires federal agencies to minimize environmental health and safety risks to children and to prioritize the identification and assessment of environmental health and safety risks that may have a disproportionate impact on children.

Americans with Disabilities Act (42 U.S.C. §§ 12101–12213)

The Americans with Disabilities Act prohibits discrimination for persons with disability and requires equal opportunity in employment, state and local government services, public accommodations, commercial facilities, and transportation.

Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. § 61)

The Uniform Relocation Assistance and Real Property Program ensures that persons displaced as a result of a federal action or by an undertaking involving federal funds are treated fairly, consistently, and equitably. This helps to ensure persons will not suffer disproportionate injuries as a result of projects designed for the benefit of the public as a whole.

United States Environmental Protection Agency School Siting Guidelines

In December 2007, the Energy Independence and Security Act was enacted by Congress and included a requirement for U.S. Environmental Protection Agency (EPA) to develop guidelines for the siting of school facilities with the following considerations: (1) special vulnerabilities of children to hazardous substances or pollution exposures in any case in which the potential for contamination at a potential school site exists; (2) modes of transportation available to students and staff; (3) efficient use of energy; and (4) potential use of a school at the site as an emergency shelter (currently available www.epa.gov/schools/siting/downloads/School_Siting_Guidelines.pdf). These guidelines are intended to assist local school districts and community members with understanding environmental factors in making school siting decisions. Though state agencies, such as the California High-Speed Rail Authority (Authority), are not subject to the local plans, regulations, and requirements, the Authority may choose to consider factors set in the EPA guidelines when assessing the mitigation measures developed to minimize effects on existing or planned schools adjacent to the high-speed rail (HSR) project.

Farmland Protection Policy Act of 1981 (7 U.S.C. §§ 4201–4209 and 7 C.F.R. Part 658)

The following text, derived from the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014), may be used to describe this statute:

The Farmland Protection Policy Act (FPPA) (7 U.S.C. § 4201 et seq.) is intended to protect farmland and requires federal agencies to coordinate with the U.S. Department of Agriculture, Natural Resource Conservation Service (NRCS), if their activities may irreversibly convert farmland to nonagricultural use, either directly or indirectly. The stated purpose of the FPPA is to "minimize the extent to which federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses." The FPPA requires federal agencies to examine potential direct and indirect effects to farmland of a proposed action and its alternatives before approving any activity that would convert farmland to nonagricultural use. U.S. Department of Agriculture issues regulations to implement the FPPA (7 C.F.R. Part 658).

For the purpose of FPPA, "Important Farmland" includes prime farmland, unique farmland, and farmland of statewide or local importance, as defined by Section 1540(c)(1) of the FPPA. Classification standards differ from state to state; each state may set its own criteria for classification in each category. Federal farmland classification criteria may differ from those developed by the California Department of Conservation (DOC), which are described in Section 3.12.2.2, State. Farmland subject to FPPA requirements includes forestland, pastureland, cropland, or other land but does not include water or urban built-up land.

The FPPA exempts the following land types:

- Soil types not suitable for crops, such as rocky terrain or sand dunes.
- Sites where the project's right-of-way is entirely within a delineated urban area and the project requires no prime or unique farmland, nor any farmland of statewide or local importance.
- Farmland that has already been converted to industrial, residential, or commercial or is used for recreational activity.

The FPPA applies to projects and programs sponsored or financed in whole or in part by the federal government. FPPA implementing regulations spell out requirements to ensure that federal programs, to the extent practical, are compatible with state, local, and private programs and policies to protect farmland. The FPPA requires a rating of farmland conversion impacts based on land evaluation and site assessment criteria identified in 7 C.F.R. Part 658.5. These criteria are addressed through completion of a Farmland Conversion Impact Rating for Corridor Type Projects (NRCS-CPA-106) form, which requires input from both the federal agency involved and from the NRCS.

3.12.2.2 State

California Relocation Act (California Government Code Section 7260 et seq.)

In parallel with the federal law, the act requires state and local governments to provide relocation assistance and benefits to displaced persons as a result of projects undertaken by state or local governments that do not involve federal funds. However, because the project will receive federal funding, the Uniform Act takes precedence.

California High-Speed Rail Authority Title VI Plan

In March 2012, the Authority adopted a policy and plan to ensure that the California HSR System complies with Title VI. The policy states:

- The Authority is committed to ensuring that no person in the state of California is excluded from participation in, nor denied the benefits of, its programs, activities, and services on the basis of race, color, national origin, age, sex, or disability as afforded by Title VI of the Civil Rights Act of 1964 and Related Statutes.
- The Authority, as a federal grant recipient, is required by the Federal Railroad Administration to conform to Title VI of the Civil Rights Act of 1964 and related statutes. The Authority's sub-recipients and contractors are required to prevent discrimination and ensure non-discrimination in all of their programs, activities, and services.
- As permitted and authorized by Title VI, the Authority will administer a Title VI Program in accordance with the spirit and intent of the non-discrimination laws and regulations.

The Title VI Plan includes a commitment to inclusive public involvement of all persons affected by the high-speed train project (Authority 2012).

California High-Speed Rail Authority Limited English Proficiency Policy and Plan

In May 2012, the Authority adopted a policy and plan to ensure the California HSR Program complies with the requirements of USEO 13166. The policy states:

- It is the policy of the Authority to communicate effectively and provide meaningful access to LEP individuals to all the Authority's programs, services, and activities. The Authority will provide free language assistance services to LEP individuals encountered or whenever an LEP individual requests language assistance services.
- The Authority will treat LEP individuals with dignity and respect. Language assistance will be provided through a variety of methods, including staff interpreters, translation and inter-

preter service contracts, and formal arrangements with local organizations providing interpretation or translation services or telephonic interpreter services.

The LEP Policy and Plan supplements the Title VI Plan (Limited English Proficiency Plan, (Authority 2012b); Resolution 12-15 (Authority 2012b)).

California Land Conservation Act of 1965 (California Government Code Section 51200 et seq.)

The California Land Conservation Act of 1965, commonly known as the Williamson Act, provides a property tax incentive for the voluntary enrollment of agricultural and open space lands in contracts between local government and landowners. The contract restricts the land to agricultural and open space uses, and compatible uses defined in state law and local ordinances. Local government establishes an agricultural preserve defining the boundary within which a city or county will enter into contracts with landowners. Local governments calculate the property tax assessment based on the actual land use instead of the potential land value assuming full development, thereby providing a financial incentive to conserve agricultural or open space uses.

Williamson Act contracts are for 10 years and longer. The contract is renewed automatically each year, maintaining a constant, 10-year contract, unless the landowner or local government files to initiate nonrenewal. Should that occur, the Williamson Act would terminate 9 years after the filing of a notice of nonrenewal. Only a landowner can petition for a contract cancellation. Tentative contract cancellations can be approved only after a local government approves, and the landowner pays a cancellation fee.

California has the following policies regarding public acquisition of and locating public improvements on lands in agricultural preserves and on lands under Williamson Act contracts (Cal. Gov. Code §§ 51290–51295):

- State policy is to avoid locating federal, state, or local public improvements and improvements of public utilities, and the acquisition of land, in agricultural preserves.
- State policy is to locate public improvements that are in agricultural preserves on land other than land under Williamson Act contract.
- State policy is that any agency or entity proposing to locate such an improvement, in considering the relative costs of parcels of land and the development of improvements, give consideration of the value to the public of land, particularly prime agricultural land, in an agricultural preserve.

3.12.2.3 Regional and Local

Compile a complete inventory of adopted local and regional plans, ordinances or guidelines related to socioeconomics and communities. Use a tabular format similar to that used in the *Fresno to Bakersfield Section Final EIR/EIS*, or more recent HSR project EIR/EIS, to organize and concisely report this information. This information will become part of Volume 2 Appendix 3.1-B Regional and Local Policy Inventory.

General Plan Policies

Elements relevant to socioeconomics include land use, transportation and circulation, housing, open space and conservation, community facilities and services, and economic development. Descriptions of these elements and the policies relevant to socioeconomics and communities will be provided in the CIA as the EIR/EIS analysis will focus on inconsistencies with the general plan policies.

Other Regional and Local Jurisdiction Policies

Other relevant plans include economic development strategies, downtown revitalization plans, housing needs allocation plans, specific community plans, and bicycle master plans.

Other Regional and Local Jurisdiction Ordinances and Codes

Other relevant ordinances and codes include development and design standards.

3.12.3 Regional and Local Policy Analysis

The overall structure of this discussion is presented in Section 3.0.3, Regional and Local Policy Analysis. As described in more detail in subsection 3.0.3.2, this analysis will describe any inconsistencies or conflicts with adopted regional or local policies and implementation of the HSR project.

3.12.4 Methods for Evaluating Impacts

Evaluation of impacts on socioeconomics and communities is a requirement of NEPA and the CEQA Guidelines Appendix G requires evaluation of community-related impacts. Evaluate the socioeconomics and communities in the corridor based on detailed demographic data developed in the CIA and land use data from the Station Planning, Land Use, and Development section. Describe prior and on-going efforts to avoid socioeconomic and community impacts, including reference to impact avoidance and minimization features described in Section 2.5.2, Components of HSR Build Alternatives. Describe the methodology for developing the resource study area (RSA) and for evaluating impacts under CEQA and NEPA. Subsequent sections in these guidelines provide direction for the design of mitigation measures and the structure for presenting the content related to socioeconomics and communities.

3.12.4.1 Definition of the Resource Study Area

The socioeconomics and communities EIR/EIS section will consider two RSAs: the region is the RSA for the economic analysis and a more precise area is the RSA for evaluating community impacts. The factors making up these RSAs are described in the following sections, with additional information provided in Section 3.0.4.1, Definition of Resource Study Area, and Section 3.0.4.2, Methodology for Impact Analysis. The RSA for cumulative effects will be a larger area depending on the project section and will consider adjacent HSR project sections to ensure a broad consideration of impacts on a more regional and statewide basis. See Section 3.19, Methodology for Cumulative Impacts, for a more detailed discussion.

Table 3.12-1 presents the required information sources to help define the RSA.

Regional Study Area—Economic Impacts

The region is the RSA for economic effects, because the economic effects to fiscal revenues, job creation, school district funding and agricultural production would have regional economic implications. The Regional Consultant (RC) should define the region that represents the area that would be impacted by the beneficial and adverse economic effects of the project. Depending on the project section and professional judgment of the RC, the region may include several counties, metropolitan planning organizations, or other regional entities as determined by the environmental resource team in consultation with the Program Management Team (PMT).

Localized Study Area—Population and Community Impacts

The RSA for direct and indirect impacts on population and communities is defined as the 0.5-mile radius from the centerline of all proposed alignment alternatives, as well as the 0.5-mile radius around all proposed station locations or access points, around the maintenance sites, around affected public facilities and around other support facilities. This 0.5-mile radius is a guideline rather than a rule and not every situation will fit this metric, use professional judgment to determine if impacts extend beyond the guideline. Impacts and effects on communities are expected to occur within this 0.5-mile radius study area, inasmuch as this area represents where key resource effects on property relocation; transportation; noise and vibration; safety and security; aesthetics; parks, recreation, and open space; and cultural resources would occur.

Expand or reconfigure the RSA(s) as warranted by resource conditions and the potential extent of effects of the HSR project within or beyond the HSR section limits.

Focus the socioeconomic and communities analysis particularly on the social effects on populations and established communities along the HSR alignment based on impacts from the construction and operation of the project. Consider more distant effects to populations and communities, such as where the distances between HSR road crossings would affect access or cause displacement to communities and services.

Table 3.12-1 Resource Study Area Information

Required Information	Resource Study Area
▪ Aerial maps ▪ GIS base if possible ▪ Project description—SR system, linear and sited facilities, stations, operations, ancillary improvements ▪ Project plans and profiles, other design materials in sufficient detail to complete environmental impact assessment of all proposed improvements and operations within the affected geographic area ("project footprint") – Design elements include the HSR project and related facilities, temporary access and construction/staging areas, utility improvements and connections, etc. ▪ Station locations and footprints in sufficient detail to complete environmental impact assessment of all construction and operations, regardless of implementation or operating entity ▪ Right-of-way data showing parcel acquisitions ▪ Local and regional land use plans and other relevant land use documents ▪ Regional planning documents (regional transportation plans, regional transportation improvement program, Coastal Zone Management Plan, habitat conservation plans, etc.) ▪ US Census data ▪ Local Area Government statistical data ▪ County Government statistical data	▪ Direct impacts—RSA includes entire project footprint on or across established communities (for direct impacts), plus 0.5 mile from the track centerline ▪ Indirect impacts—Includes an area that would extend beyond the RSA such as where the HSR alignment crosses parcels that are within more than one census tract or block group ▪ Refer to other sections of the EIR/EIS as appropriate for impacts related to or influencing socioeconomics and communities ▪ Economic Impacts—RSA includes the region, which may include several counties

3.12.4.2 Methodology for Impact Analysis

Group and consolidate information and discussion to effectively present content to the lay audience (i.e., by distinct resource characteristic or component, such as census tract or block group within segments defined in Chapter 2, Alternatives). Present information on property relocation assistance, effects on school district funding, and a children's health and safety risk assessment as a result of the proposed HSR alternatives in the EIR/EIS appendix associated with this resource, with specific reference to the appendix provided in the Chapter 3 topical subsection.

Begin analysis of impacts with consideration of impact avoidance and minimization features that are incorporated into the project in Section 2.5.2, Components of HSR Build Alternatives, and evaluated in Volume 2, Appendix 2-E. Account for implementation of design features or best management practices. Refer to the summary table of impact avoidance and minimization features, and explain how particular features avoid impacts or ensure less-than-significant socioeconomic and community impacts.

The methodology used to evaluate socioeconomic and community impacts is generally based on *the Caltrans Standard Environmental Reference Environmental Handbook Volume 4: Community Impacts Assessment*. For the impact analysis methods also see Chapters 2 and 4 through 8 in the Caltrans guidance (www.dot.ca.gov/ser/vol4/vol4.htm). Discuss both construction-related and operational impacts as well as direct impacts and indirect, or secondary, impacts, such as impacts as a result of new facilities required to replace displaced housing, schools, and other public services. Apply the same impact thresholds in both project timeframes. Include a review of the data and impact analyses in the other sections prepared for the EIR/EIS, including Transportation, Air Quality and Global Climate Change, Noise and Vibration, Safety and Security, Station Planning, Land Use, and Development, Agricultural Lands, Parks, Recreation, and Open Space, Aesthetics and Visual Resources, Cultural Resources, Environmental Justice, and Regional Growth.

Disruption or Division of Established Communities

For the purpose of this analysis, a community is defined as *a population rooted in one place, where the daily life of each member involves contact with and dependence on other members,* and community cohesion is defined as *the degree to which residents have a 'sense of belonging' […] and the degree of interaction among the individuals, groups, and institutions that make up the community* (Caltrans 2011). Because "community" implies a certain concentration of residences, often with associated businesses and services, focus the community impact analysis on urban neighborhoods and rural residential cities, towns, and unincorporated communities.

Consider the potential division of adjacent communities through the physical removal of residences, businesses, and important community facilities. These effects could disrupt established patterns of interactions among community residents, alter the physical shape, character, or function of communities or neighborhoods, isolate one part of a community from another, or disrupt residents' access to community facilities and services. Also consider temporary or permanent barriers that could be created by the project to determine whether they would isolate portions of a community, separate residents from important community facilities or services, or alter access to such resources.

Consider substantial increases in noise or traffic, which could have adverse consequences on community members' interactions in the project vicinity. Substantial changes in visual quality or aesthetics could result in a perceived change to community character or the quality of life experienced in affected neighborhoods and impacts to schools. Consider whether project construction or operation would affect normal school operations or access to the school and associated facilities, as well as growth-related effects on the existing school capacity and enrollment.

Refer to Section 3.2, Transportation, Section 3.4, Noise and Vibration, Section 3.16, Aesthetics and Visual Quality, Section 3.11, Safety and Security, and Chapter 4, Environmental Justice, for a full discussion of potential impacts in communities located along the alternative alignments.

Baseline information may vary as a result of the relative size of the community, city, or neighborhood, which influences the amount of data collected. Consider the following when collecting data:

- Potential impact findings through field research and discussions with persons knowledgeable about local community conditions and neighborhood characteristics, such as local elected officials, service providers, city planners, neighborhood associations, and community residents
- Review of aerial photographs and geographic information system (GIS) layers showing the spatial relationship between the proposed alternatives and existing community resources
- Census information, the assessor's parcel data, and other databases (e.g., Reference USA (Infogroup 2010)) to identify the number and types of community facilities that may be displaced or disrupted
- Secondary research, such as a review of local planning documents and city websites to identify unique attributes and resources of the affected communities

Consider project benefits as well as potentially adverse impacts. Consider alternative project alignments in relation to the existing physical boundaries of communities, to the locations of key community facilities and services, and to unique neighborhood attributes to determine the potential impacts on access to facilities and services as well as on community character or community cohesion.

Displacement and Relocation of Local Residents, Businesses, and Services

Work with Right-of-Way to identify full and partial parcel acquisitions using aerial photographs, conceptual engineering plans, profiles, and accurate right-of-way data showing potential parcel acquisitions. Provide acquisition information in a tabular form and include an analysis of the availability of suitable replacement housing and business locations. Consider current market conditions relative to the timeframe in which the data is gathered (i.e., recent economic downturns or upturns).

If the project would displace existing structures or acquire enough of a property to affect the property's intended use this should be considered a full parcel acquisition. In the case of full acquisition, all residences and businesses on the parcel are assumed displaced and offered relocation assistance. The term "displacement" is used to represent property acquisition of a parcel or structure(s), while the term "relocation" is used to represent finding new properties for displaced residents, businesses, and organizations in acquired structures. Many parcels would be partially acquired, and acquisition of the structures located on the parcel would not be necessary. However, this does not mean there would be no adverse impacts on these properties. For example, partial acquisition could result in the edge of the right-of-way being within several feet of a structure, making continued use of the structure unlikely. Property acquisition could require relocation of driveways or eliminate access to business loading docks. During construction, building occupants on partially acquired parcels would be exposed to noise, dust, and heavy vehicle traffic that could temporarily adversely affect property use. Access to properties as well as structures could also be restricted during construction. Also consider the effects of displacement on employees to businesses affected by property acquisitions, as well as effects from relocated government and public services on local community members. Since identifying the individual circumstances surrounding each partial acquisition of parcels may not be possible, be conservative and avoid underestimating displacements and relocations. Count all residences and businesses on partially acquired parcels, including those that may ultimately be temporarily affected—for example, impacts associated with construction that are not expected to last through

project operation—as full displacements requiring relocation. This assumption allows for a worst-case assessment of potential property acquisition impacts. The final full and partial parcel acquisition decisions would ultimately be determined on a case-by-case basis during the land acquisition phase of the project.

Economic Effects

Impacts to property and sales tax revenues, job creation, school district funding, and agricultural production have positive and negative regional implications. Use the following methodologies for examining these effects.

- **Property and Sales Tax Revenue Changes**—Overall, the project's effects on property and sales tax revenues will vary.

  Base the assessment of changes in property tax revenues on anticipated full property acquisitions as a proportion of the county-tax assessed values of acquired properties. The assessed values of agricultural lands should consider the taxed values as set under Williamson Act contract, if applicable. Compare the resulting estimated tax-revenue reductions with the entire county tax base to assess the intensity and context of this change.

  The assessed changes in sales tax revenues should examine effects during the first few years of the project after the start of construction, as well as the anticipated long-term change in sales tax revenues during operation. In the first analysis, assess whether or not the short-term temporary changes in sales tax revenues from the acquisition of commercial and industrial properties would be substantial as these businesses relocate and re-establish themselves. For long-term assessment of sales tax revenues, examine the ongoing sales tax revenues that would result from the purchase of goods and services associated with the continued operation and maintenance of the HSR.

- **Employment**—The project is anticipated to improve state and regional interconnectivity, while creating job opportunities across many sectors of the regional economy. This job creation would occur both during the short-term construction and long-term operation of the project. Determine whether project-related job creation could be expected to be filled by the region's existing labor force or whether the new jobs would attract labor to the region.

  To estimate short-term construction employment, use the Bureau of Economic Analysis Regional Input-Output Modeling System II model and bill of goods method to estimate the region-wide potential direct, indirect, and induced job creation resulting from project spending in the construction and manufacturing sectors.[1] The long-term employment expansion resulting from the operation of the HSR would occur as new businesses are attracted to California and businesses already in the state expand. Regionally, the spatial reallocation of employment would be based on changes in business location by firms benefiting from the increased statewide mobility that the HSR project provides.

- **Changes in School District Funding**—Base the assessment of the potential financial impacts on school districts on possible changes in school district funding due to shifts in student populations in communities with substantial numbers of residential displacements. The examination of property tax revenue changes, as described above, provides an understanding of the potential effects to school district funding resulting from property acquisition. In addition, school district funding in California is dependent on student attendance; therefore, relocation of large populations of students outside of affected school districts would reduce district funding. To determine the potential likelihood of any such

[1] Direct job creation is a measure of those new construction-related jobs that result from building the project itself. Indirect job creation is a measure of new jobs generated in businesses in the area that would supply goods and services to the project construction, such as equipment suppliers, construction companies, and maintenance firms. Induced job creation is a measure of new jobs in new or existing businesses, such as retail stores, gas stations, banks, restaurants, and service companies, which may supply goods and services to these new direct and indirect workers and their families.

adverse effects, examine areas with large numbers of residential displacement to determine if relocation outside of current school district boundaries would be necessary. Compare the total number of housing units that may be displaced in a school district with the number of comparable vacant housing units in the school district to determine if a substantial number of families with enrolled students may be forced to relocate outside of their current school district. School funding impacts may occur in an area where a large number of displaced residents would need to relocate to homes outside of their current school district.

- Economic Effects on Agriculture—The project could acquire agricultural land and convert it to HSR use, resulting in the loss of agricultural production. Compensation for any lost production would be incorporated into the property acquisition compensation paid to owners. However, some production would probably not be easily relocated, and the production that is relocated would take time to become re-established. Therefore, some short-term reduction in agricultural production could occur.

  Calculate a dollar-value estimate of reduced agricultural production and state and county data on jobs generated per dollar of revenue used to estimate the corresponding potential direct agricultural job loss for these revenue reductions. These losses would be a result of both direct land acquisition for project right-of-way and indirect land acquisition near the project to provide new access roads along the edge of fields. Obtain data addressing the locations of particular crop production and animal operations from county agricultural sources. Estimate the value of agricultural production affected by property acquisition using county price data for affected crops and animals.

  The methodology to assess the economic effects on the agricultural industry provides an indication of impacts across the region and allows for the comparison of the HSR project alternatives. Since some individual agricultural operations would be affected more than others, consider this cost to agricultural operations on a case-by-case basis during the land acquisition phase of the project.

3.12.4.3 Method for Determining Significance under NEPA

As described in more detail in Section 3.0.4.3, NEPA does not define thresholds for evaluating socioeconomic and community impacts. Use professional judgment when considering the resource context, the intensity and duration of the potential effect and implementation of mitigation measures to determine whether an impact is significant or less than significant.

3.12.4.4 Method for Determining Significance under CEQA

Based on the CEQA Guidelines, the project would have a significant impact if it would:

- Physically divide an established community
- Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere
- Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services, including fire protection, police protection, schools, parks, other public facilities

In accordance with Section 15064(e) of the CEQA Guidelines, *economic and social changes resulting from a project shall not be treated as significant effects on the environment.* Therefore, no CEQA significance criteria are provided for economic impacts. CEQA does, however, address

the conversion of agricultural land to nonagricultural uses (see Section 3.14, Agriculture Farmlands and Forest Land, for that evaluation).

3.12.5 Affected Environment

Describe the existing demographic and economic conditions in the region, communities, and within the RSA that could be impacted by the No Project alternative and the HSR project alternatives. Focus on data and issues that may influence potential effects and environmental commitments. Present this information in the geographic segments defined in Chapter 2, Alternatives. Table 3.12-2, Table 3.12-3, and Table 3.12-4 provide key information needed for a complete description of the Affected Environment and typical sources for the information. Additional information can be added when required by the local/regional conditions.

Table 3.12-2 Key Information and Sources for Social Setting

Key Information	Sources of Information
▪ Demographic characteristics that include ethnic group, age, income – Ethnic Mix—Ethnic composition of the existing population, as well as recent trends or changes in ethnic composition should be identified – Age Distribution—Discuss distribution of the population by general age groups – Income—Identify median income of the RSA (compared to the city, county, and region) ▪ Population low mobility status (elderly and/or disabled) ▪ Existing and projected population and the relevant demographic characteristics of the RSA and the associated city, county, and region ▪ Community/neighborhood characteristics and trends ▪ Population growth, policies and trends ▪ Maps, tables, and charts to help describe the setting ▪ Results from conducting field research and interviews/discussions with persons knowledgeable about local community conditions and neighborhood characteristics, such as local elected officials, service providers, city planners, and community residents ▪ Household size and composition – Existing number of households and average household size should be discussed in the context of how these have changed in recent years – Discuss the composition of households in terms of number of single heads of households, female heads of households, and families	▪ Caltrans Environmental Handbook Volume 4—Community Impacts Assessment, Sections 3-4 www.dot.ca.gov/ser/vol4/vol4.htm ▪ Program EIR/EIS ▪ U.S. Census data ▪ U.S. Department of Commerce ▪ General and regional plans ▪ Field surveys ▪ Aerial and ground photography ▪ GIS Data ▪ Regional Transportation Plans socioeconomic forecasts ▪ U.S. Department of Housing and Urban Development ▪ American Community Survey ▪ California Employment Development Department ▪ California Department of Finance ▪ Regional Associations of Governments, and other sources available to provide most current regional and local data ▪ Local Planning and Redevelopment agencies ▪ Public service providers ▪ Scoping comments ▪ Outreach efforts to low-income and minority populations, which should be detailed in the Environmental Justice Outreach Plan

Table 3.12-3 Key Information and Sources for Housing and Business Setting

Key Information	Sources of Information
▪ Residential characteristics – This is of particular concern if there is the potential for displacements and the need for subsequent relocations – Characteristics include types of housing in RSA and associated City or County, including single family, multifamily, apartments, mobile homes, owner occupied/rented, sizes, range of prices, and general age ▪ Projections and trends of housing stock ▪ Number of foreclosures in RSA and associated City or County ▪ Local housing policies and programs ▪ Business characteristics if they are likely to be affected by the project, including number, general size, types of businesses ▪ Local or regional conditions that could affect the current and future use of business properties (e.g., reliability of affordable water, adjacent incompatible development, local or regional sprawl, endangered species consideration, soil/water contamination) ▪ Maps and tables to help describe the setting ▪ Public services/facilities including schools, parks and recreation, trails and bikeways, religious institutions, hospitals, police and fire protection, etc. ▪ Circulation and access within the RSA	▪ Caltrans Standard Environmental Reference Environmental Handbook Volume 4 (October 2011)—Community Impacts Assessment; Section 3.3 www.dot.ca.gov/ser/envhand.htm ▪ Program EIR/EIS ▪ U.S. Department of Commerce ▪ Local Chambers of Commerce ▪ General and regional plans ▪ Field surveys ▪ Local realtors; electronic real estate services (e.g., DataQuick) ▪ U.S. Census Data ▪ Aerial and ground photography ▪ GIS Data ▪ California Housing and Community Development ▪ Local planning and redevelopment agencies ▪ Scoping comments ▪ Outreach efforts which should be defined in the public involvement plans

Table 3.12-4 Key Information and Sources for Economic Setting

Key Information	Sources of Information
▪ Population and employment in the region, County, local jurisdictions, and RSA for the baseline year and projected year ▪ Employment by industry in the region, county, and local jurisdictions ▪ Employment and unemployment for the local jurisdictions located in the RSA, as well as the state and county ▪ Revenue generated from property tax and sales tax for the local jurisdictions located in the RSA, as well as the county ▪ Maps and tables to help describe the setting ▪ Agricultural economic setting (if applicable) ▪ School district funding	▪ Caltrans Environmental Handbook Volume 4—Community Impacts Assessment, Section 3.3 www.dot.ca.gov/ser/envhand.htm ▪ Program EIR/EIS ▪ California Employment Development Department ▪ California State Board of Equalization ▪ U.S. Census data ▪ General and regional plans ▪ Aerial and ground photography ▪ GIS data ▪ Planning and redevelopment agencies ▪ Outreach efforts which should be defined in the public involvement plans

Include a concise summary description of existing populations and communities along the proposed HSR alignments and at proposed HSR facilities. In particular:

- Identify existing neighborhoods, community services, and local businesses. Create a map to illustrate the locations of these communities and services, alternatives, and proposed mitigation measures.
- Document established local policies concerning land use, housing characteristics, community facilities, public services and utilities.
- Describe pertinent stakeholder issues and concerns from public outreach efforts.
- Cross-reference all sections of the EIR/EIS that describe the resources or are related to the resources (e.g., refer to relevant content in the Station Planning, Land Use and Development or Parks, Recreation, Open Space, Environmental Justice).

3.12.5.1 Note about Census 2010 Data

All census data should be updated to the greatest extent possible. A key source to update the 2010 Census information is the U.S. American Community Survey (ACS). The most recent 5-year ACS is the 2007-2011 ACS. The 2008-2012 ACS data is scheduled for release in December 2013. Use whichever dataset is available at the start of analysis. Should the 5-year ACS dataset be updated after the Draft EIR/EIS was circulated for public and agency comment, confer with the Authority, FRA, and PMT to determine whether to update tables and figures with new ACS data or continue with older data. Explain the determination within the text of the Final EIR/EIS. Annual and 3-year ACS data are also available, but are only released for geographies with population exceeding 65,000 and 20,000, respectively. And unlike the Decennial Census, the ACS survey data does not collect data for the exact same data each year. Describe unemployment characteristics, which can be obtained from the California Employment Development Department. The California Department of Finance provides population and housing estimates for cities, counties, and the state. The regional associations of governments (Southern California Association of Governments, San Bernardino Associated Governments, etc.) also can be a good source for data.

3.12.6 Environmental Consequences

General formatting and terminology for constructing the discussion of environmental consequences is provided in Section 3.0.6, Environmental Consequences. The following direction is specific for the evaluation of socioeconomics and communities. The heading structure for the Socioeconomics and Communities EIR/EIS discussion is shown in Section 3.12.11.

Each impact should be given a number and a short descriptive title, e.g., *SO #1 Construction of the HSR station and associated parking facilities would displace existing housing and local businesses currently operating on-site and in the immediate vicinity.* Use tables, graphical representation of data and GIS rich data maps whenever possible to summarize the impacts and simplify the text or even eliminate text that describes information contained in the table. Maps should be of sufficient scale to illustrate the geographic relationship of the alternatives to affected properties. The map boundary shall not exceed the extent of the project segment, and must clearly show the location and area of extent of project impacts and major landscape features. Obtain Authority, FRA and PMT concurrence on mapping scale before preparing the EIR/EIS section.

Follow the impacts discussion with brief evaluations of consequences, with separate paragraphs and conclusions on the NEPA and the CEQA consequences. Table 3.12-5 identifies topics and issues to be evaluated in this section.

3.12.7 Mitigation Measures

General formatting and terminology for constructing the discussion of mitigation measures is provided in Section 3.0.7, Mitigation Measures. The following direction is specific for the evaluation of socioeconomics and communities. Present the mitigation measures associated with the project alternatives within each geographic segment under the subheadings of Construction Impacts and Operations Measures. The heading structure for the Socioeconomic and Communities EIR/EIS discussion is shown in Section 3.12.11.

Develop project-level measures that are consistent with adopted program and project strategies that avoid or minimize impacts. Begin by considering programmatic mitigation strategies described in Section 3.0.7 and the socioeconomics and communities-related technical reports and environmental document sections in the most recent environmental documents produced by the Authority (e.g., *Fresno to Bakersfield Section Final EIR/EIS*, or more recent HSR project EIR/EIS) as applicable to the HSR project section.

Identify section-specific measures to mitigate any significant impacts, considering implementation of the relocation assistance programs provided by the Authority and the requirements of the Uniform Relocation Assistance and Real Property Acquisition Policies Act, as amended. Explain the reason why the mitigation measures reduce specific impacts listed in Section 3.12.6 and how effective they are in avoiding or reducing each impact.

Table 3.12-5 Topics and Socioeconomic and Community Issues to Evaluate

Topic	Issues to Evaluate
Disruption or division of established communities	▪ Physical removal of homes, businesses, important community facilities ▪ Disruption of established patterns of interactions among community members ▪ Alteration of physical shape, character or function of communities or neighborhoods ▪ Isolation of communities ▪ Effects on Children’s Health and Safety ▪ Disruption of access ▪ Existence or creation of Physical barriers ▪ Substantial increased noise or traffic ▪ Substantial changes in visual quality or aesthetics ▪ Pedestrian safety hazards ▪ Parking loss or intrusion ▪ Displace substantial numbers of residents and businesses
Relocation of local residents and businesses	▪ Full and partial acquisitions ▪ Available replacement homes and businesses ▪ Current market conditions ▪ Displacements and relocations ▪ Disruption to local businesses
Economic effects	▪ Property and sales tax revenue changes ▪ Employment ▪ Schools ▪ Changes in school district funding ▪ Economic effects on agriculture ▪ Sales revenue changes

For mitigation measures, provide a brief descriptive title and a number (e.g., *MM-SO #1*) that corresponds to the short descriptive title and number assigned to the primary resource impacts to assist tracking. Describe mitigation measures that are specific to the resource subsection and include code and title references to measures specific to other resources that provide mitigation benefits to the subsection resources. The mitigation measures must be drafted to facilitate transition into the Mitigation Monitoring and Enforcement Plan by clearly identifying responsibility and timing for implementation, as appropriate.

The following text, derived from the *Fresno to Bakersfield Section Final EIR/EIS* may be used to introduce the description of mitigation measures:

> *The Statewide Program EIR/EIS mitigation strategies have been refined and adapted for this project-level EIR/EIS. The evaluation of impacts in this section is based largely on impacts identified in other sections of this draft EIR/EIS, including Section 3.2, Transportation; Section 3.3, Air Quality and Global Climate Change; Section 3.4, Noise and Vibration; Section 3.13, Station Planning, Land Use, and Development; Section 3.15, Parks, Recreation, and Open Space; Section 3.16, Aesthetic and Visual Resources; and Section 3.18, Regional Growth. These sections include mitigation measures that will minimize or avoid some of the social and economic impacts identified. In addition, the Authority will apply the following mitigation measures to reduce substantial adverse environmental impacts resulting from implementation of the [identify CAHSR Section] of the HSR project.*

3.12.8 Impacts from Implementing Mitigation Measures

The overall content and approach to evaluating the impacts from implementing mitigation measures is presented in Section 3.0.8, Impacts from Implementing Mitigation Measures.

Consider and disclose both positive and negative impacts of mitigation measures as part of the environmental analysis. Evaluate all mitigation measures, including off-site measures, using the methods in Section 3.12.4. Determine probable impacts using actual, on-the-ground analysis and describe the substantial basis for analytical conclusions (including defined thresholds or other criteria). When the impacts of mitigation measures cannot be quantified (e.g., at a specific location, in a definite extent, at a particular time or duration, or measurable alteration of the affected resource), evaluate potential impacts using clearly described assumptions based upon reasonably foreseeable outcomes.

3.12.9 Impacts Summary

3.12.9.1 NEPA Impacts

The overall structure and content of this discussion is presented in Section 3.0.9.1, NEPA Impacts. The heading structure for this organizational scheme is shown in Section 3.12.11. Use maps, as appropriate, to show locations of significant impacts of alternatives by segment.

3.12.9.2 CEQA Significance Conclusions

The overall structure and content of this discussion is presented in Section 3.0.9.2, CEQA Significance Conclusions. The heading structure for this organizational scheme is shown in Section 3.12.11. Use maps, as appropriate, to show locations of significant unavoidable impacts of alternatives by segment.

3.12.10 Products

The HSR RC is responsible for preparing the following products, under Authority and FRA direction, according to PMT guidance and subject to PMT quality control and assurance.

3.12.10.1 Technical Report or Appendix (as applicable to HSR project section)

In addition to the Volume 1 impacts analysis chapter, provide technical reports and Volume 2 appendices where full analysis applicable to the HSR project section requires details in excess of efficient inclusion in the EIR/EIS Volume 1 chapter. For example:

1. Volume 2, Appendix 2-E, Project Impact Avoidance and Minimization Features Analysis
2. Volume 2 Appendix 3.1-B Regional and Local Policy Inventory
3. Volume 2, Appendix 3.12-A, Residential, Business, and Mobile Home Relocation and Assistance Brochures
4. Volume 2, Appendix 3.12-B, Effects on School District Funding and Transportation Bus Routes
5. Volume 2, Appendix 3.12-C, Children's Health and Safety Risk Assessment
6. Community Impact Assessment Technical Report—The CIA will generally follow the guidance provided in Caltrans Standard Environmental Reference Environmental Handbook Volume 4. The CIA will describe the relevant existing conditions, the potential impacts of the project on the community and its neighborhoods, the significance of the identified impacts, and potential mitigation measures to best avoid significant adverse impacts resulting from the project. The CIA will also describe the public involvement activities, focusing on how the communities are outreached to and how the public input is considered, including outreach activities that have been accomplished to date and future planned outreach activities. The CIA will include an assessment of social impacts, economic impacts, relocation impacts, public service and facility impacts, and non-motorized transportation impacts. Land use data will be described in the land use technical report (or EIR/EIS).

3.12.10.2 Project EIR/EIS Volume 1

1. Summary/Table for EIR/EIS Executive Summary
2. Project Description—Socioeconomics and Communities-related Components (as applicable to HSR project section, consistent with the project CIA):
   a. Impact Avoidance and Minimization Features
   b. Summary Table of Impact Avoidance and Minimization Features, and Project Impacts
3. Affected Environment, Environmental Consequences and Mitigation Measures Section: Socioeconomics and Communities

3.12.11 Socioeconomics and Communities EIR/EIS Outline

The RC will use the following outline for organizing content related to the hydrology and water resources in Chapter 3 of the project EIR/EIS, using the heading hierarchy and format as indicated. The RC will consider the impacts of mitigation measures in Section 3.12.7.

- 3.12 Socioeconomics and Communities
  - 3.12.1 Introduction
  - 3.12.2 Laws, Regulations and Orders
    - 3.12.2.1 Federal
    - 3.12.2.2 State
    - 3.12.2.3 Regional and Local
  - 3.12.3 Regional and Local Policy Analysis
  - 3.12.4 Methods for Evaluating Impacts
    - 3.12.4.1 Definition of Resource Study Areas
    - 3.12.4.2 Method for Determining Significance under NEPA
    - 3.12.4.3 Method for Determining Significance under CEQA
  - 3.12.5 Affected Environment
    - 3.12.5.1 Project Segment 1
      - Alternative 1
      - Alternative 2
      - Alternative 3
      - Alternative N
    - 3.12.5.2 Project Segment 2
      - Alternative 1
      - Alternative 2
      - Alternative 3
      - Alternative N
    - 3.12.5.3 Project Segment 3
      - Alternative 1
      - Alternative 2
      - Alternative 3
      - Alternative N
    - 3.12.5.4 Project Segment N
      - Alternative 1
      - Alternative 2
      - Alternative 3
      - Alternative N
  - 3.12.6 Environmental Consequences
    - 3.12.6.1 Overview
    - 3.12.6.2 Project Segment 1
      - No Project
      - Alternative 1
        - Construction Impacts
        - Operations Impacts
      - Alternative 2
        - Construction Impacts
        - Operations Impacts
      - Alternative 3
        - Construction Impacts
        - Operations Impacts
      - Alternative N
        - Construction Impacts
        - Operations Impacts

- 3.12.6.3 Project Segment 2
  - No Project
  - Alternative 1
    - Construction Impacts
    - Operations Impacts
  - Alternative 2
    - Construction Impacts
    - Operations Impacts
  - Alternative 3
    - Construction Impacts
    - Operations Impacts
  - Alternative N
    - Construction Impacts
    - Operations Impacts
- 3.12.6.4 Project Segment 3
  - No Project
  - Alternative 1
    - Construction Impacts
    - Operations Impacts
  - Alternative 2
    - Construction Impacts
    - Operations Impacts
  - Alternative 3
    - Construction Impacts
    - Operations Impacts
  - Alternative N
    - Construction Impacts
    - Operations Impacts
- 3.12.6.5 Project Segment N
  - No Project
  - Alternative 1
    - Construction Impacts
    - Operations Impacts
  - Alternative 2
    - Construction Impacts
    - Operations Impacts
  - Alternative 3
    - Construction Impacts
    - Operations Impacts
  - Alternative N
    - Construction Impacts
    - Operations Impacts

3.12.7 Mitigation Measures

- 3.12.7.1 Project Segment 1
  - Alternative 1
    - Construction Measures
    - Operations Measures
  - Alternative 2
    - Construction Measures
    - Operations Measures
  - Alternative 3
    - Construction Measures
    - Operations Measures

- Alternative N
  - Construction Measures
  - Operations Measures

3.12.7.2 Project Segment 2
- Alternative 1
  - Construction Measures
  - Operations Measures
- Alternative 2
  - Construction Measures
  - Operations Measures
- Alternative 3
  - Construction Measures
  - Operations Measures
- Alternative N
  - Construction Measures
  - Operations Measures

3.12.7.3 Project Segment 3
- Alternative 1
  - Construction Measures
  - Operations Measures
- Alternative 2
  - Construction Measures
  - Operations Measures
- Alternative 3
  - Construction Measures
  - Operations Measures
- Alternative N
  - Construction Measures
  - Operations Measures

3.12.7.4 Project Segment N
- Alternative 1
  - Construction Measures
  - Operations Measures
- Alternative 2
  - Construction Measures
  - Operations Measures
- Alternative 3
  - Construction Measures
  - Operations Measures
- Alternative N
  - Construction Measures
  - Operations Measures

3.12.8 NEPA Impacts Summary

3.12.8.1 Alternative 1
- Construction Impacts
- Operations Impacts

3.12.8.2 Alternative 2
- Construction Impacts
- Operations Impacts

3.12.8.3 Alternative 3
- Construction Impacts
- Operations Impacts

3.12.8.4 Alternative N
Construction Impacts
Operations Impacts
3.12.9 CEQA Significance Conclusions
3.12.9.1 Alternative 1
Construction Impacts
Operations Impacts
3.12.9.2 Alternative 2
Construction Impacts
Operations Impacts
3.12.9.3 Alternative 3
Construction Impacts
Operations Impacts
3.12.9.4 Alternative N
Construction Impacts
Operations Impacts

3.13 Station Planning, Land Use, and Development

The methodology guidelines in this section are organized by a sequence of steps for preparing an environmental document. Section 3.13.11 provides an outline for this environmental impact report/environmental impact statement (EIR/EIS) section.

Section 3.0, General Methodology Guidance for Resource Sections, provides the methodological framework common to the evaluation of all resource areas. Section 3.19, Cumulative Impacts, provides the cumulative impact analysis methodology. Use Section 3.0 and Section 3.19 in combination with this Station Planning, Land Use, and Development guidance section when developing the EIR/EIS analyses.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the resource section. Example text that illustrates the concepts and methods is shown in *italics*. The methods are organized to mirror the organization of the EIR/EIS section or chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

If there is a discrepancy between the material in this guidance and any adopted federal or state agency guideline or manual applicable to HSR station planning, land use, and development, the agency guideline and manual controls. Identify and discuss any such discrepancy with the California High-Speed Rail Authority (Authority), Federal Railroad Administration (FRA) and the Program Management Team (PMT) before deviating from this guidance.

3.13.1 Introduction

The general method for preparing an introduction for this resource section is provided in Section 3.0.1, Introduction. The following direction is specific to Station Planning, Land Use, and Development.

Refer to related content in other sections of the EIR/EIS that influence or are influenced by the Station Planning, Land Use, and Development impact analysis (such as transportation; socio-economics and communities; agricultural lands; parks, recreation, and open space; and regional growth) and supportive/associated technical documents. References to other documents must include citations to specific sections (by lowest heading tier, e.g., 3.X.X), not just a general reference to a chapter in the EIR/EIS.

3.13.2 Laws, Regulations, and Orders

Federal, state, and local laws, regulations, orders or plans germane to station planning, local land use and development affected by the project are presented below. National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) requirements for assessment and disclosure of environmental impacts are described in Section 3.1, Introduction, and are therefore not restated in the resource section of the chapter.

3.13.2.1 Federal

Wilderness Act (16 U.S.C. §§ 1131—1136) (as applicable to a given section)

The Wilderness Act preserves and protects wilderness areas in their natural condition for use and enjoyment by present and future generations. This law applies to all lands designated by Congress as part of the wilderness system and provides criteria for determining suitability and establishes restrictions on activities that can be undertaken in a designated area.

Farmland Protection Policy Act (7 U.S.C. §§ 4201–4209; 7 C.F.R. Part 658) (as applicable to a given section)

The Farmland Protection Policy Act requires that before taking or approving any federal action that would result in conversion of farmland, the agency must examine the effects of the action using the criteria set forth in the Act, and, if there are adverse effects, must consider the following alternatives to lessen them in coordination with the Natural Resource Conservation Service.

Coastal Zone Management Act (16 U.S.C. §§ 1451–1464; 15 C.F.R. Parts 923, 930) (as applicable to a given section)

The Coastal Zone Management Act applies to all projects significantly affecting areas under the control of the State Coastal Zone Management Agency. Before federal approval is granted, a consistency determination with the approved Coastal Zone Management Plan from the state would be required.

Wild and Scenic Rivers Act (16 U.S.C. §§ 1271–1287) (as applicable to a given section)

The Wild and Scenic Rivers Act preserves certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations.

Federal Land Policy and Management Act (43 U.S.C. §§ 1701–1782) (as applicable to a given section)

The Federal Land Policy and Management Act directs how the Bureau of Land Management manages public lands. The Bureau of Land Management sets forth guidelines for public land use planning and management which include preservation and protection of certain lands in their natural condition where appropriate.

3.13.2.2 State

California Land Conservation Act (California Government Code Section 51200 et seq.) (as applicable for a given section)

The California Land Conservation Act, commonly known as Williamson Act, provides tax incentives for the voluntary enrollment of agricultural and open space lands in contracts between local government and landowners to deter the early conversion of agricultural and open-space lands.

California Coastal Act (Cal. Public Res. Code, §§ 30000–39000) (as applicable for a given section)

The California Coastal Act defines coastal zone and establishes land development controls for the zone, including requirements for a coastal development permit.

California Coastal Commission implementing regulations (Cal. Code Regs,. tit.14, § 5.5) (as applicable for a given section)

The regulations define the permitting process including restrictions, appeals, and enforcement, as well as, permits issued by local governments and public agencies.

Sustainable Communities and Climate Protection Act of 2008 (SB 375 Chapter 728)

This statute requires regional planning agencies to include a "Sustainable Community Strategy" or "Alternative Planning Strategy" in the next version of their regional transportation plans (RTP). The Sustainable Communities Strategy (SCS) will coordinate land use, housing needs, and transportation/transit planning to meet the regional target for the reduction of greenhouse gas emissions from automobiles and light trucks established by the California Air Resources Board.

Coordination is enforced by requiring transportation projects identified in the RTP to comply with the SCS in order to receive state and federal funding through the regional housing needs allocation. The requirements of SB 375 will be reflected in the 2014 RTPs adopted by the [identify the applicable agencies].

California State Planning and Zoning Law (California Gov. Code § 65000–66037)

The law delegates most of the state's local land use and development decisions to cities and counties and describes laws pertaining to the regulation of land uses by local governments, including the general plan requirement, specific plans, subdivisions, and zoning.

3.13.2.3 Regional and Local Regulatory Framework

Compile a complete inventory of adopted local and regional plans, ordinances or guidelines related to station planning, land use, and development. Use a tabular format similar to that used in the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014), or more recent high-speed rail (HSR) project EIR/EIS, to organize and concisely report this information. This information will become part of Volume 2 Appendix 3.1-B Regional and Local Policy Inventory.

- Metropolitan transportation plans, regional transportation plans, sustainable communities strategies
- County or municipal general plans or community plans
  - Land use, community character, transportation/circulation, housing, growth management, greenhouse gas strategy, sustainability or similar elements of the general plan
  - Goals, objectives, policies or implementation measures
- Specific plans or redevelopment plans (as applicable/locally enforceable)
- County or Municipal Jurisdiction Ordinances and Codes
  - Zoning or other land development ordinances
  - Development or design standards or guidelines
- Local coastal program regulations (as applicable to sections within or affecting coastal zone)

3.13.3 Regional and Local Policy Analysis

The overall structure of this discussion is presented in Section 3.0.3, Regional and Local Policy Analysis.

3.13.4 Methods for Evaluating Impacts

Evaluation of land use impacts is a requirement of the California Land Conservation Act (Williamson Act), CEQA, NEPA, and FRA Procedures for Considering Environmental Impacts (64 FR 28545), which states that an EIS should consider aspects of possible impacts related to coastal zone management and land use, existing and planned. Identify each of the land uses in the corridor based on information available from local and regional planning documents, geographic information system (GIS) data, and on-the-ground surveys. In addition, describe prior and on-going efforts to avoid disruption to existing land uses and community structure. Describe the methodology for developing the environmental resource study area (RSA) and for evaluating effects under CEQA and NEPA. Subsequent sections in this methodology provide direction for the design of mitigation measures and the structure for presenting content related to station planning, land use, and development in the EIR/EIS documents.

3.13.4.1 Definition of Resource Study Area

The RSA is the area in which all environmental investigations specific to station planning, land use, and development are conducted to determine the resource characteristics and potential

impacts of the project segment. The factors making up the RSA and the description of the elements comprising the RSA (including an illustrative figure) are provided in Section 3.0.4.1, Definition of Resource Study Area, and Section 3.0.4.2, Methodology for Impact Analysis.

The boundary of the RSA for station planning, land use, and development in rural areas is the project footprint, because the compact footprint of the HSR alignment would not be expected to substantially alter the large acre pattern of land uses in rural areas. The RSA boundary in suburban and urban areas extends 150 feet beyond the project footprint so as to consider the potential change to land use composition adjacent to the project footprint. The land use impact analysis focuses particularly on stations and maintenance facilities, which have the greatest probability of changing land use type and intensity, population density, and patterns of development. The RSA for stations extends beyond the edges of a rectangular box around the perimeter of potential station footprints. The RSA distances may be refined, in consultation with the PMT and local jurisdictions, to reflect local conditions and indirect land use impacts. Consider more distant land use effects where necessary, such as where roadway intersection impacts would influence land use decisions, and indirect land use impacts that occur beyond the project footprint. The RSA for cumulative impacts will be a larger area depending on the project section and will consider adjacent HSR sections to ensure a broad consideration of impacts on a more regional and statewide basis. See Section 3.19, Methodology for Cumulative Impacts, for a more detailed discussion.

Physical and operational elements of the RSA are described in Table 3.13-1. This table presents the required information sources and baseline metrics to help define the RSA.

Table 3.13-1 Environmental Resource Study Area Information

Required Information	Resource Study Area
▪ Aerial maps ▪ Geographic Information System (GIS) base if possible ▪ Project description—HSR system, linear and sited facilities, stations, operations, ancillary improvements ▪ Project plans and profiles, other design materials in sufficient detail to complete environmental impact assessment of all proposed improvements and operations within the affected geographic area ("project footprint") – Design elements include the HSR project and related facilities, temporary access and construction/staging areas, utility improvements and connections, etc. ▪ Station locations and footprints in sufficient detail to complete environmental impact assessment of all construction and operations, regardless of implementation or operating entity ▪ Construction phases and interim build conditions/transitions for all project and ancillary improvements, and stations ▪ Right-of-way data showing parcel acquisitions ▪ Local and regional land use plans and other relevant land use documents	▪ Existing and planned land uses within the project footprint ▪ Existing and planned land uses within the RSA and more distant land uses where project elements could impact these uses (such as roadway intersection impacts) ▪ Information from other sections of the EIR/EIS as appropriate for impacts related to or influencing station planning, land use, and development. – These sections may include Transportation, Socioeconomics and Communities, Environmental Justice, Agricultural Lands, Parks, Recreation and Open Space, and Regional Growth.

3.13.4.2 Methodology for Impact Analysis

Group and consolidate information and discussion in the EIR/EIS to effectively present content to the lay audience (i.e., by distinct resource characteristic or component, such as types of land uses). Conflict with applicable land use plans, policies or regulations is not considered an environmental impact for the purposes of determining significance under CEQA, yet provides the

context for determining significance under NEPA. Consider project actions and avoidance and minimization measures that improve or otherwise benefit land uses in the evaluation of impact significance.

Analyze how the project will impact station areas, adjacent land uses, and future development, as well as indirect impacts related to station planning, land use and development through quantitative analysis and, where necessary, with qualitative analysis. Analyze impacts which may occur during construction and operation of the HSR system (*note:* the analytical results for construction impacts and operations impacts are presented separately in the EIR/EIS). Table 3.13-2 identifies key topics and issues to be considered in the Station Planning, Land Use and Development EIR/EIS analysis.

Table 3.13-2 Key Topics and Issues for Station Planning, Land Use and Development Impacts

Topic	Issues to Evaluate
Local land use development	▪ Proposed project in relationship to other planned projects and whether the project would disrupt existing or planned development anticipated to benefit the community ▪ Whether the project would cause changes in travel patterns and accessibility ▪ Direct and indirect land use and development impacts associated with increased density of development around stations
Station planning	▪ Existing station area development and character (e.g., long-established single-family neighborhood, industrial area, retail area, historic district, agriculture, parks and recreation, and cultural resources) ▪ Existing station area parking supply and existing regional parking policies (see also, Transportation Section) ▪ Conceptual transit-oriented and/or station-oriented joint development opportunities that have been defined by the Authority working with engineering and design teams and local authorities
Land Use	▪ Relative sensitivity of existing land uses proximate to project alternatives to conditions arising from construction, operation or maintenance of the HSR project alternatives

Apply the same impact thresholds in both project timeframes, focusing on how the alignment would affect adjacent land uses and how the proposed stations would affect existing and proposed downtown development. Consider the type of development and redevelopment opportunities that are created through implementation of an HSR station and evaluate the potential adverse and beneficial impacts upon existing land uses with planned development. Where new facilities need to be constructed, including facilities replacing infrastructure that is displaced by HSR, evaluate whether there is nearby land that is appropriately zoned and provide a discussion of anticipated impacts. Focus on the relocation of critical or large facilities where nearby site availability may be constrained by existing development.

Base the analysis on a review of available reports and data (including federal and state statutes, resource agency, local, and regional agency policies and ordinances), discussions with agency representatives in the region, field investigation, modeling (where applicable), and professional judgment. Review the data and impact analyses relative to land use in the other sections prepared for the EIR/EIS, including Transportation, Socioeconomics and Communities, Environmental Justice, Agricultural Lands, Parks, Recreation and Open Space, Public Utilities, and Regional Growth. Group and consolidate land use information and discussion by distinct categories of land use within each alignment segment defined in Chapter 2, Alternatives. Present detailed information on land use changes or alteration of development plans as a result of the

proposed HSR alternatives in an EIR/EIS land use appendix, with specific reference to the appendix provided in the Chapter 3 topical subsection to help the reader navigate between volumes.

Develop GIS databases for each project segment (1) as part of project design or (2) from available federal, state, and local sources. Provide sufficient detail to allow complete analysis of the anticipated design of the completed project or of reasonable assumptions for project implementation, including the alignment right-of-way, station site plans, including any off-site parking structures, and maintenance facilities. The map boundary shall not exceed the extent of the project segment and must clearly show the areal extent of project impacts and major landscape features. Obtain Authority, FRA and PMT concurrence on mapping scale before preparing the administrative draft EIR/EIS section.

Use quantitative analysis and GIS tools to determine direct and indirect impacts from station planning, land use, and development actions. Focus the analysis on the project's potential to alter existing land use conditions in the RSA(s). Use qualitative analysis to evaluate the type of development and redevelopment opportunities anticipated with implementation of HSR stations. Evaluate the compatibility of the HSR alternatives on the bases of (1) the potential sensitivity of various existing land uses to the changes that likely would result from project implementation and (2) the potential impact of these changes on the type, intensity and pattern of existing land uses. Identify where permit applications will be needed and provide analysis to support future permit review.

3.13.4.3 Method for Determining Significance under NEPA

NEPA does not provide a definitive threshold to determine significant or potentially significant land use impacts, as described in more detail in the General Methodology Guidance. The RC must use professional judgment when considering the context, intensity and duration of impacts to determine the significance of impacts. Consider all relevant aspects of context (e.g., existing resource conditions, resource sensitivity), appropriate factors of intensity (e.g., extent of change, duration of change), and implementation of mitigation measures for determining impact significance.

3.13.4.4 Method for Determining Significance under CEQA

For this analysis, the project would result in a significant impact on land use and development if it would:

- Cause a substantial change in land use patterns incompatible with adjacent land uses
- Induce substantial population growth in an area, beyond planned levels, either directly or indirectly.

As indicated previously, the HSR project is an undertaking of the Authority and FRA, in their capacities as state and federal agencies, and is therefore not required to be consistent with local plans. The approach to analyzing the significance of land use impacts that is recommended in Appendix G of the State CEQA Guidelines (i.e., "Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project [including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance] adopted for the purpose of avoiding or mitigating an environmental effect") is used for information, not for evaluation of significance of impacts. Local land use plans are not applicable because the HSR project is a state and federal government project, and, as such, is not subject to local government jurisdictional issues of land use. Consequently, a city or county is not "an agency with jurisdiction over the project" as described in Appendix G. Therefore, although the EIR/EIS provides a regional and local policy analysis to provide a context for the project, inconsistency with such plans is not considered an environmental impact.

3.13.5 Affected Environment

Include a concise summary description of existing land uses along the proposed HSR alignments and at proposed HSR facilities. In particular:

- Identify existing land uses. Create a map to illustrate the locations of existing land uses along the alignment and at proposed station sites for each project segment. Ensure the map is of sufficient scale to illustrate the geographic relationship of the alternatives to existing land uses and that the map boundary does not exceed the extent of the project segment and clearly shows the location and area of extent of project impacts and major landscape features. Obtain Authority, FRA, and PMT concurrence on mapping scale before preparing an administrative draft EIR/EIS section.
- Document established local policies concerning the land use related impacts and reconciliation efforts for any project inconsistencies with these policies.
- Describe pertinent stakeholder issues and concerns from public outreach efforts and personal contact with local agencies.
- Cross-reference all subsections of the EIR/EIS (by lowest heading tier, e.g., 3.X.X) that describe the resources or are related to the resources (e.g., for Station Planning, Land Use and Development, refer to relevant content in the Agricultural Lands section or Transportation section)

Table 3.13-3 provides key information needed for a complete description of the Affected Environment and typical sources for the information.

Table 3.13-3 Key Information and Sources for Affected Environment

Key Information	Sources
▪ Applicable policy and plans ▪ Existing and planned land uses ▪ Local growth (historic and projected) ▪ Environmental constraints to future development ▪ Land use density and character ▪ Parcels available for development ▪ Parking supply	▪ General and regional plans ▪ Field surveys ▪ Socioeconomic data ▪ Aerial and ground photography ▪ Topographic maps ▪ GIS ▪ Planning and development agencies ▪ Chambers of Commerce ▪ California Coastal Commission (as applicable) ▪ Others (e.g., airport land use commissions)

3.13.6 Environmental Consequences

General formatting and terminology for constructing the discussion of environmental consequences is provided in Section 3.0.6, Environmental Consequences. The following direction is specific for the evaluation of Station Planning, Land Use and Development. The heading structure for the EIR/EIS section is shown in Section 3.13.11.

Applying the NEPA considerations of context and intensity and the CEQA thresholds of significance, give each impact a number and short descriptive title, e.g., *Impact LU#2-Implementing the HSR project would permanently convert existing agricultural land uses to transportation serving land uses.* Explain the results of the analysis prescribed in the Methods for Evaluating Impacts subsection. In particular, describe how the activity or physical change causes an impact upon the resource (e.g., disrupting established land use patterns). A table may be the best way to show this impact across alternatives. An example summary paragraph and associated table relating to this impact from the *Fresno to Bakersfield Section Final EIR/EIS* are provided below.

Impact LU#2-Implementing the HSR project would permanently convert existing agricultural land uses to transportation serving land uses. Table 3.13-4 summarizes the estimated acreage for each land use that the [number]alignment alternatives would convert to transportation-serving uses. The table includes impacts for the [name] Alternative in its entirely, as well as impacts for each of the other [number] alternatives, and the difference in land use impacts between these alternatives and the corresponding segment of the [name] Alternative. The estimated acreage was calculated in GIS using the permanent footprint of the [number] alignment alternatives.

Table 3.13-4 Permanent Land Use Impacts by Alternative (Acres)(example only)

Alternative	Single Family	Multi-family	Commercial	Industrial	Community Facilities	Agricultural	Other*	Total Acres
BNSF	105	11	44	245	87	2,363	1,091	3,947
Hanford West Bypass 1	20 (1)	1 (-1)	0 (0)	22 (8)	1 (0)	431 (-420)	417 (268)	893
Hanford West Bypass 1 Modified	16 (-3)	1 (-1)	0 (0)	4 (-10)	0 (0)	424 (-413)	400 (251)	843

Numbers in parentheses illustrate the difference in acres of land use impact that would occur for each alternative as compared to the corresponding segment of the BNSF Alternative.
Includes all project components. Numbers may vary slightly due to rounding up.
*Other includes Right-of-Way, Transportation, and Vacant Lands.

The NEPA and CEQA assessments shall reach specific, separate conclusions about significance for each impact based on the NEPA considerations of context and intensity and CEQA significance criteria defined in the NEPA and CEQA subsections of Section 3.13.4.

3.13.7 Mitigation Measures

General formatting and terminology for constructing the discussion of mitigation measures is provided in Section 3.0.7, Mitigation Measures. The following direction is specific for the evaluation of Station Planning, Land Use, and Development. Present the mitigation measures associated with the project alternatives within each geographic segment under the subheadings of Construction Measures and Operations Measures. The heading structure for this organizational scheme is shown in Section 3.13.11.

Develop project-level measures that are consistent with adopted program and project strategies that avoid or minimize impacts. Begin by considering programmatic mitigation strategies described in Section 3.0.7 and the station planning, land use, and development-related technical reports and environmental document sections in the most recent environmental documents produced by the Authority (e.g., *Fresno to Bakersfield Section Final EIR/EIS*, or more recent HSR project EIR/EIS), as applicable to the HSR project section.

Draft mitigation measures to facilitate transition into the Mitigation Monitoring and Enforcement Plan by identifying responsibility and timing for implementation, as appropriate. Within the land use section many related impacts to other resources have mitigation measures that work to further reduce the likelihood of impacts on land uses. Identify these mitigations in the land use section and refer the reader to the more detailed discussion in the relevant EIR/EIS resource area

section. An example of this discussion as presented in the *Fresno to Bakersfield Section Final EIR/EIS* is provided below:

> ***Mitigation Measures***
>
> *Many related impacts in other resources have mitigation measures that work to further reduce the likelihood for impacts on land uses. For example, mitigation measures for transportation are found in Section 3.X.X, Transportation; for community resources, in Section 3.X.X, Socioeconomics and Communities; Section 3.X.X Environmental Justice; for parks in Section 3.X.X, Parks, Recreation, and Open Space; and for regional growth in Section 3.X.X, Regional Growth. In addition, the following mitigation measures (which are described in Section 3.3.9, Air Quality and Global Climate Change; Section 3.4.7, Noise and Vibration; Section 3.14, Agricultural Lands; and Section 3.16.7, Aesthetics and Visual Resources) would also mitigate various impacts on land use:*
>
> ***AQ-MM#1:*** *Reduce Criteria Exhaust Emissions from Construction Equipment to reduce temporary air pollution emissions that could disturb adjacent land uses*
>
> ***N&V-MM#1:*** *Construction Noise Mitigation Measures to minimize temporary noise disruption to adjacent land uses*
>
> ***AG-MM#1:*** *Preserve the Total Amount of Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland to reduce long-term land use impacts and policy conflicts.*
>
> ***AVR-MM#1a:*** *Minimize Visual Disruption from Construction Activities to reduce temporary visual impacts on adjacent land uses*
>
> *The Authority has considered avoidance and minimization measures that are consistent with commitments in the Program EIR/EIS documents. No additional measures have been identified to minimize or avoid significant land use impacts.*

3.13.8 Impacts from Implementing Mitigation Measures

General guidance for constructing the discussion of impacts from implementing mitigation measures is provided in Section 3.0.8, Impacts from Implementing Mitigation Measures.

Consider and disclose both positive and negative impacts of mitigation measures as part of the environmental analysis. Evaluate all mitigation measures, including off-site measures, using the methods in Section 3.13.4. Determine probable impacts using actual, on-the-ground analysis and describe the substantial basis for analytical conclusions (including defined thresholds or other criteria). When the impacts of mitigation measures cannot be quantified (e.g., at a specific location, in a definite extent, at a particular time or duration, or measurable alteration of the affected resource), evaluate potential impacts using clearly described assumptions based upon reasonably foreseeable outcomes. For brevity, provide a summary explanation where the details of analyses and conclusions are documented in a technical appendix in Volume 2 (covering all potential impacts from implementing mitigation measures).

3.13.9 Impacts Summary

3.13.9.1 NEPA Impacts

The overall structure and content of this discussion is presented in Section 3.0.9.1, NEPA Impacts. The heading structure for this organizational scheme is shown in Section 3.13.11. Use maps, as appropriate to show locations of significant impacts of alternatives by segment.

3.13.9.2 CEQA Significance Conclusions

The overall structure and content of this discussion is presented in Section 3.0.9.2, CEQA Significance Conclusions. The heading structure for this organizational scheme is shown in Section 3.13.11. Use maps, as appropriate to show locations of significant unavoidable impacts of alternatives by segment.

3.13.10 Products

The HSR RC is responsible for preparing the following products, under Authority and FRA direction, according to PMT guidance and subject to PMT quality control and assurance.

3.13.10.1 Technical Report or Appendix

In addition to the Volume 1 impacts analysis chapter, provide technical reports and Volume 2 appendices where full analysis applicable to the HSR project section requires details in excess of efficient inclusion in the EIR/EIS Volume 1 chapter. For example:

1. Volume 2, Appendix 3.1-B, Regional and Local Policy Inventory
2. Volume 2, Appendix 3.13-A, Station Area Planning; Land Use Plans, Goals and Policies
3. Station Planning, Land Use and Development Technical Report

3.13.10.2 Project EIR/EIS Volume 1

1. Summary/Table for EIR/EIS Executive Summary
2. Project Description—Station Planning, Land Use and Development-related Components (as applicable to HSR project section):
   a. Impact Avoidance and Minimization Features
   b. Summary Table of Impact Avoidance and Minimization Features, and Project Impacts
3. Affected Environment, Environmental Consequences and Mitigation Measures Section: Station Planning, Land Use and Development
4. Affected Environment, Environmental Consequences and Mitigation Measures Section: Cumulative Impacts

3.13.11 Station Planning, Land Use and Development EIR/EIS Outline

The RC will use the following outline for organizing content related to the hydrology and water resources in Chapter 3 of the project EIR/EIS, using the heading hierarchy and format as indicated. The RC will consider the impacts of implementing mitigation measures in Section 3.13.7.

3.13 Station Planning, Land Use, and Development
- 3.13.1 Introduction
- 3.13.2 Laws, Regulations and Orders
  - 3.13.2.1 Federal
  - 3.13.2.2 State
  - 3.13.2.3 Regional and Local
- 3.13.3 Regional and Local Policy Analysis
- 3.13.4 Methods for Evaluating Impacts
  - 3.13.4.1 Definition of Resource Study Area
  - 3.13.4.2 Method for Determining Significance Under NEPA
  - 3.13.4.3 Method for Determining Significance Under CEQA

3.13.5 Affected Environment
- 3.13.5.1 Project Segment 1
  - Alternative 1
  - Alternative 2
  - Alternative 3
  - Alternative N
- 3.13.5.2 Project Segment 2
  - Alternative 1
  - Alternative 2
  - Alternative 3
  - Alternative N
- 3.13.5.3 Project Segment 3
  - Alternative 1
  - Alternative 2
  - Alternative 3
  - Alternative N
- 3.13.5.4 Project Segment N
  - Alternative 1
  - Alternative 2
  - Alternative 3
  - Alternative N

3.13.6 Environmental Consequences
- 3.13.6.1 Overview
- 3.13.6.2 Project Segment 1
  - No Project
  - Alternative 1
    - Construction Impacts
    - Operations Impacts
  - Alternative 2
    - Construction Impacts
    - Operations Impacts
  - Alternative 3
    - Construction Impacts
    - Operations Impacts
  - Alternative N
    - Construction Impacts
    - Operations Impacts
- 3.13.6.3 Project Segment 2
  - No Project
  - Alternative 1
    - Construction Impacts
    - Operations Impacts
  - Alternative 2
    - Construction Impacts
    - Operations Impacts
  - Alternative 3
    - Construction Impacts
    - Operations Impacts
  - Alternative N
    - Construction Impacts
    - Operations Impacts

3.13.6.4 Project Segment 3
No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.13.6.5 Project Segment N
No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.13.7 Mitigation Measures
3.13.7.1 Project Segment 1
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.13.7.2 Project Segment 2
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures

Alternative N
Construction Measures
Operations Measures
3.13.7.3 Project Segment 3
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.13.7.4 Project Segment N
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.13.8 NEPA Impacts Summary
3.13.8.1 Alternative 1
Construction Impacts
Operations Impacts
3.13.8.2 Alternative 2
Construction Impacts
Operations Impacts
3.13.8.3 Alternative 3
Construction Impacts
Operations Impacts
3.13.8.4 Alternative N
Construction Impacts
Operations Impacts
3.13.9 CEQA Significance Conclusions
3.13.9.1 Alternative 1
Construction Impacts
Operations Impacts
3.13.9.2 Alternative 2
Construction Impacts
Operations Impacts
3.13.9.3 Alternative 3
Construction Impacts
Operations Impacts

3.13.9.4 Alternative N

Construction Impacts

Operations Impacts

3.14 Agricultural Farmland and Forest Land

The methodology guidelines in this section are organized by a sequence of steps for preparing an environmental document. Section 3.14.11 provides an outline for this environmental impact report/environmental impact statement (EIR/EIS).

Section 3.0, General Methodology Guidance for Resource Sections, provides the methodological framework common to the evaluation of all resource areas. Section 3.2, Transportation, discusses project effects upon rural roads and provisions for access across the high-speed rail (HSR) right-of-way for farm equipment. Section 3.4, Noise and Vibration, discusses noise and vibration impacts on confined animals. Section 3.6, Public Utilities and Energy, addresses impacts on irrigation pipelines and canals, and project water demand. Section 3.8, Hydrology and Water Resources, addresses the potential for surface and groundwater impacts. Section 3.12, Socio-economics and Communities addresses agricultural economics and the potential for loss of tax revenues associated with agricultural land conversion. Section 3.13, Station Planning, Land Use, and Development and Section 3.18, Regional Growth, discuss agricultural zoning and the effects of future urban development of farmlands.

Section 3.19, Cumulative Impacts, provides the cumulative impact analysis methodology. Use Section 3.0, Section 3.19, and pertinent information from the sections identified above in combination with this Agricultural Farmland and Forest Land guidance section when developing the EIR/EIS analyses.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the resource section. Example text that illustrates the concepts and methods is shown in *italics*. The methods are organized to mirror the organization of the EIR/EIS section or chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

If there is a discrepancy between the material in this guidance and any adopted federal and state agency guideline or manual applicable to agricultural farmland or forest land, the agency guideline or manual controls. Identify and discuss any such discrepancy with the California High-Speed Rail Authority (Authority), Federal Railroad Administration (FRA), and the Program Management Team (PMT) before deviating from this guidance.

3.14.1 Introduction

The general method for preparing an introduction for this resource section is provided in Section 3.0.1, Introduction. The following discussion presents direction specific to Agricultural Farmland and Forest Land.

Refer specifically to related content in other sections of the EIR/EIS that influence or are influenced by the Agricultural Lands impact analysis (e.g., transportation; noise and vibration; public utilities and energy; socioeconomics and communities; station planning, land use and development; regional growth) and supportive/associated technical documents. References to other documents must include citation to specific sections (by lowest heading tier, e.g., 3.X.X), not just a general reference to a chapter in the EIR/EIS.

3.14.2 Laws, Regulations, and Orders

Federal, state and local laws, regulations, orders or plans relevant to agricultural lands in the geographic area that is affected by the project are presented below. General National Environ-mental Policy Act (NEPA) and California Environmental Quality Act (CEQA) requirements for assessment and disclosure of environmental impacts are described in Section 3.1, Introduction, and are therefore not restated in the resource section of the chapter.

3.14.2.1 Federal

Farmland Protection Policy Act of 1981 (7 U.S.C. §§ 4201–4209 and 7 C.F.R. Part 658)

The Farmland Protection Policy Act (FPPA) is intended to protect farmland and requires federal agencies to coordinate with the U.S. Department of Agriculture (U.S. DOA), Natural Resource Conservation Service (NRCS), if their activities may irreversibly convert farmland to nonagricultural use, either directly or indirectly. The stated purpose of the FPPA is to "minimize the extent to which federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses." The FPPA requires federal agencies to examine potential direct and indirect effects to farmland of a proposed action and its alternatives before approving any activity that would convert farmland to nonagricultural use. U.S. DOA issues regulations to implement the FPPA.

For the purpose of FPPA, "Important Farmland" includes prime farmland, unique farmland, and farmland of statewide or local importance, as defined by Section 1540(c)(1) of the FPPA. Classification standards differ from state to state; each state may set its own criteria for classification in each category. Federal farmland classification criteria may differ from those developed by the California Department of Conservation (DOC), which are described in Section 3.14.2.2. State Farmland subject to FPPA requirements includes forestland, pastureland, cropland, or other land but does not include water or urban built-up land.

The FPPA exempts the following land types:

- Soil types not suitable for crops, such as rocky terrain or sand dunes
- Sites where the project's right-of-way is entirely within a delineated urban area and the project requires no prime or unique farmland, nor any farmland of statewide or local importance
- Farmland that has already been converted to industrial, residential, or commercial or is used for recreational activity

The FPPA applies to projects and programs sponsored or financed in whole or in part by the federal government. FPPA implementing regulations identify requirements to ensure that federal programs, to the extent practical, are compatible with state, local, and private programs and policies to protect farmland. The FPPA requires a rating of farmland conversion impacts based on land evaluation and site assessment criteria identified in 7 C.F.R. Part 658.5. These criteria are addressed through completion of a Farmland Conversion Impact Rating for Corridor Type Projects form (NRCS-CPA-106), which requires input from both the federal agency involved and from NRCS.

Resource Management Plans

Land and Resource Management Plans (LRMP) are required by the Rangeland Renewable Resource Planning Act of 1974 as amended by the National Forest Management Act of 1976 to assist agencies in the management of the nation's natural resources. The assessment of project plans in relationship to LRMPs is a requirement of NEPA.

List applicable LRMPs and discuss resources and policies that are important for the affected forestland.

- Bureau of Land Management Resource Management Plans
- U.S. Forest Service Forest Plans

3.14.2.2 State

California Land Conservation Act of 1965 (Cal. Gov. Code, § 51200 et seq.)

The California Land Conservation Act of 1965, commonly known as the Williamson Act, provides a property tax incentive for the voluntary enrollment of agricultural and open space lands in

contracts between local government and landowners. The contract restricts the land to agricultural and open space uses, and compatible uses defined in state law and local ordinances. A county or city establishes an agricultural preserve defining the boundary within which the local government will enter into contracts with landowners. Local governments calculate the property tax assessment based on the actual land use instead of the potential land value assuming full development, thereby providing a financial incentive to conserve agricultural or open space uses.

Williamson Act contracts are for 10 years and longer. The contract is renewed automatically each year, maintaining a constant, 10-year contract, unless the landowner or local government files to initiate nonrenewal. Should that occur, the Williamson Act contract would terminate 9 years after the filing of a notice of nonrenewal. Only a landowner can petition for a contract cancellation. Tentative contract cancellations can be approved only after a local government approves, and the landowner pays a cancellation fee.

California has the following policies regarding public acquisition of and locating public improvements on lands in agricultural preserves and on lands under Williamson Act contracts(Cal. Gov. Code §§ 51290–51295):

- State policy is to avoid locating federal, state, or local public improvements and improvements of public utilities, and the acquisition of land, in agricultural preserves.
- State policy is to locate public improvements that are in agricultural preserves on land other than land under Williamson Act contract.
- State policy is that any agency or entity proposing to locate such an improvement, in considering the relative costs of parcels of land and the development of improvements, give consideration of the value to the public of land, particularly prime agricultural land, in an agricultural preserve.

Since 1998, another option in the Williamson Act Program has been established with the creation of Farmland Security Zone (FSZ) contracts. An FSZ is an area created within an agricultural preserve by a county board of supervisors upon the request of a landowner or group of landowners. FSZ contracts offer landowners greater property tax reductions and have a minimum initial term of 20 years. Like Williamson Act contracts, FSZ contracts renew annually unless an owner files a notice of nonrenewal.

Farmland Mapping and Monitoring Program

The Farmland Mapping and Monitoring Program (FMMP) is the only statewide agricultural land use inventory conducted on a regular basis. DOC administers the FMMP, under which it maintains an automated map and database system to record changes in agricultural land use. “Important Farmland” under the FMMP is listed by category, as described below. The categories are defined according to U.S. DOA land inventory and monitoring criteria, as modified for California:

For the purpose of this analysis, Important Farmland includes:

Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance.

- Prime Farmland—Prime Farmland is land with the best combination of physical and chemical features to sustain long-term agricultural crop production. These lands have the soil quality, growing season, and moisture supply necessary to produce sustained high yields. Soil must meet the physical and chemical criteria determined by the NRSC. Prime Farmland must have been used for production of irrigated crops at some time during the 4 years prior to the FMMP’s mapping date.
- Farmland of Statewide Importance—Farmland of Statewide Importance is similar to Prime Farmland but with minor differences, such as having greater slopes or soils with a lesser ability to store moisture. Farmland of Statewide Importance must have been used for production of irrigated crops at some time during the 4 years prior to the mapping date.

- Unique Farmland—Unique Farmland has lesser quality soils than Prime Farmland or Farmland of Statewide Importance. Unique Farmland is used for producing the state's leading agricultural crops. These lands usually are irrigated, but may include non-irrigated orchards or vineyards found in some climatic zones. Unique Farmland must have been used for crops at some time during the 4 years prior to the mapping date.
- Farmland of Local Importance—Farmland of Local Importance is farmland that is important to the local agricultural community as determined by each county's board of supervisors and local advisory committees.

The FMMP focuses on agricultural land that has the special combination of soil quality, location, growing season, and moisture supply needed to produce sustained yields of crops. Farmland of local importance can cover a broader range of agricultural uses, and is initially identified by a local advisory committee convened in each county by FMMP in cooperation with the NRCS and the county board of supervisors.

California Farmland Conservancy Program Act (Cal. Public Res. Code, §§ 10200–10277)

This act provides a mechanism for DOC to establish agricultural conservation easements on farmland. "Agricultural conservation easement" means an interest in land, less than fee simple, which represents the right to prevent the development or improvement of the land for any purpose other than agricultural production. The easement is granted for the California Farmland Conservancy Program by the owner of a fee simple interest in land to a local government, nonprofit organization, resource conservation district, or to a regional park or open-space district or regional park or open-space authority that has the conservation of farmland among its stated purposes or as expressed in the entity's locally adopted policies. It is granted in perpetuity and runs with the land. The landowner may make a request to DOC that the easement be reviewed for possible termination 25 or more years from the date of sale of the agricultural conservation easement.

California Timberland Productivity Act of 1982 (Cal. Gov. Code, § 51100 et seq.)

This law seeks to "discourage premature or unnecessary conversion of timberland to urban and other uses; discourage expansion of urban services into timberland; and encourage investment in timberlands based on reasonable expectation of harvest." The Act established the Timberland Production Zone (TPZ) or TPZ regulatory tool and describes the powers and duties of local governments in protecting timberlands. Similar to the Williamson Act, this law provides a property tax incentive for the voluntary enrollment of timber production lands in contracts between local government and landowners. The contract restricts the land to timber production and open space uses, and compatible uses defined in state law and local ordinances. Timberland production contract are for 10 years and longer. A county or city establishes a timberland preserve through zoning that defines the boundary within which the local government will enter into contracts with landowners.

Sustainable Communities and Climate Protection Act of 2008 (SB 375)

Senate Bill (SB) 375, the *Sustainable Communities and Climate Protection Act of 2008* (Chapter 728, Statutes of 2008),, provides a new planning process to coordinate community development and land use planning with regional transportation plans (RTP) in an effort to reduce sprawling land use patterns and dependence on private vehicles, and thereby reduce vehicle miles travelled (VMT) and greenhouse gas (GHG) emissions associated with VMT. SB 375 is one major tool being used to meet the goals in Assembly Bill (AB) 32, the Global Warming Solutions Acts (Chapter 488, Statutes of 2006). Under SB 375, the California Air Resources Board (CARB) sets GHG emission reduction targets for 2020 and 2035 for the metropolitan planning organizations (MPO) in the state. Each MPO must then prepare a "sustainable communities strategy" (SCS) that meets the GHG emission reduction targets set by CARB. Once adopted, the SCS will be incorporated into the region's RTP.

3.14.2.3 Regional and Local Regulatory Framework

Compile a complete inventory of adopted local and regional plans, ordinances or guidelines related to agricultural lands. A tabular format similar to that used in the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014), or more recent HRS project EIR/EIS, may be used to organize and concisely report this information. This information will become part of Volume 2 Appendix 3.1-B Regional and Local Policy Inventory.

- City and county general plans, comprehensive plans, specific plans, documents and maps provided by city and county planning departments, etc., applicable to the study area (these do not regulate the HSR project, but are included for context)
- Local agricultural protection zoning ordinances and zones
- Farmland security zone contracts
- Williamson Act contracts
- Timberland production or protection zones
- Relevant regional and local forest land plans, policies, and protection regulations
- Conservation easement programs
- Resource management plans, including those for forest lands

3.14.3 Regional and Local Policy Analysis

The overall structure of this discussion is presented in Section 3.0.3, Regional and Local Policy Analysis. As described in more detail in subsection 3.0.3.2, this analysis will describe any inconsistency or conflict with adopted regional or local policies and implementation of the HSR project.

3.14.4 Methods for Evaluating Impacts

Evaluation of impacts on agricultural land is a requirement of the FPPA and California Land Conservation Act, as well as CEQA and NEPA. List all the farmlands and forests in the resource study area (defined below) as known (based on the Agricultural Resources/Farmlands and Land Use sections of the environmental document and the FMMP). In addition, describe prior and on-going efforts to avoid conversion of agricultural lands, including reference to impact avoidance and minimization features described in Section 2.5.2, HSR Build Alternatives. Describe the methodology for developing the resource study area (RSA) and for evaluating effects under CEQA and NEPA. Subsequent sections in the methodology guidelines provide direction for the design of mitigation measures and the structure for presenting content related to agricultural lands in the EIR/EIS documents.

3.14.4.1 Definition of Resource Study Area

The RSA is the area in which all environmental investigations specific to agricultural lands are conducted to determine the resource characteristics and potential impacts of the Project Segment. The factors to be considered when determining the extent of the RSA and the description of the elements comprising the RSA (including an illustrative figure) are provided in Section 3.0.4.1, Definition of Resource Study Area, and Section 3.0.4.2, Methodology for Impact Analysis.

The boundaries of the environmental RSA for agricultural lands extend beyond the project footprint. The agricultural land impact analysis focuses particularly on the conversion of Important Farmlands and forests to nonagricultural and forest use. To ensure thorough consideration of potential indirect impacts, also include properties where the alignment disrupts uses that are dependent upon movement across the alignment, or where there may not be sufficient remnant property after conversion of areas to HSR uses to support continued

agricultural uses. For direct impacts on agricultural lands, the resource study area is the project footprint, as described in Chapter 2, Alternatives, plus 100 feet from the track centerline based on federal standards for evaluating livestock noise impacts (*High-Speed Ground Transportation Noise and Vibration Impact Assessment* (FRA 2012)). Provide reference in the analysis to the subsection in Section 3.4, Noise and Vibration, where livestock impacts are discussed. Indirect and secondary impacts on agricultural lands and uses may occur beyond the project footprint, such as where the HSR alignment crosses parcels that are within a FSZ or encumbered by a Williamson Act contract, or where conversion of land to HSR use affects off-site agricultural uses or activities on adjacent properties (e.g., parcel severance causes changes to movement of agricultural equipment on adjacent parcel, so consider effects within a 25-foot-wide buffer area adjacent to the edge of the HSR project footprint). Consider more distant agricultural land effects where necessary, such as where the distances between HSR road crossings would influence access to agricultural lands or continued agricultural operations. The resource study area for cumulative effects will be a broader area depending on the project section and will consider adjacent HSR project sections to ensure consideration of agricultural land conversion and forestland impacts on a more regional and statewide basis. See Section 3.19, Methodology for Cumulative Impacts, for more detailed discussion.

Table 3.14-1 describes the required information sources, physical and operational elements, and baseline metrics to help define the RSA.

Table 3.14-1 Resource Study Area Information

Required Information	Resource Study Area
▪ Aerial maps ▪ Geographic information system (GIS) base ▪ Project description—HSR system, linear and sited facilities, stations, operations, ancillary improvements ▪ Project plans and profiles, other design materials in sufficient detail to complete environmental impact assessment of all proposed improvements and operations within the affected geographic area ("project footprint") – Design elements include the HSR project and related facilities, temporary access and construction/staging areas, utility improvements and connections, etc. ▪ Station locations and footprints in sufficient detail to complete environmental impact assessment of all construction and operations, regardless of implementation or operating entity ▪ Construction phases and interim build conditions/transitions for all project and ancillary improvements, and stations ▪ Right-of-way data showing parcel acquisitions ▪ Local and regional land use plans and other relevant land use documents, including Local Coastal Plans ▪ Regional planning documents identifying conservation lands (habitat conservation plans, etc.) ▪ Data for prime farmland, farmland of statewide importance, unique farmland, farmland of local importance, Grazing Land, Farmland Security Zone and Williamson Act contracts land ▪ Agricultural conservation easements ▪ Boundaries of forest service land, any timber harvesting plans, and other forest management plans	▪ Entire project footprint on or across agricultural lands (for direct impacts), plus 100 feet from the track centerline based on federal standards for evaluating livestock noise impacts (*High-Speed Ground Transportation Noise and Vibration Impact Assessment* (FRA 2012)) ▪ Other sections of the EIR/EIS as appropriate for impacts related to or influencing agricultural lands and uses ▪ Parcel-by-parcel analysis of the alternative project alignments and corresponding parcel boundaries for Farmland Security Zone and Williamson contracts lands ▪ Potential station and other facility sites on non-agricultural lands may be excluded from this RSA ▪ Indirect impacts—study area would extend 25 feet beyond the project footprint and 100 feet beyond track centerline where agricultural and forest uses are changed by HSR construction and operation.

3.14.4.2 Methodology for Impact Analysis

Begin analysis of impacts with consideration of impact avoidance and minimization features that are incorporated into the project in Section 2.5.2, HSR Build Alternatives, and evaluated in Volume 2, Appendix 2-E. Account for implementation of design features or best management practices. Refer to the summary table of impact avoidance and minimization features, and explain how particular features avoid impacts or ensure less-than-significant impacts to agricultural lands.

Group and consolidate information and discussion in the EIR/EIS to effectively present content to the lay audience (i.e., by distinct resource characteristic or component, such as conversion of Important Farmland and forest land; effects of dust, noise, and wind on adjacent agricultural operations (e.g., orchards, dairies); and parcel severance). Present detailed information on impacts to agricultural land as a result of the proposed HSR alternatives in the EIR/EIS Volume 2 appendix associated with this resource. Prepare the following information pertaining to the list of Basin Plan water bodies in Section 3.8.5. This information will be compiled in a Volume 2 technical appendix with all other information from Chapter 3 that is related to impacts upon beneficial uses of Basin Plan waters within the RSA to inform the Clean Water Act Section 401 Certification.

- Environmental Consequences—Assessment of potential impacts upon irrigation, stock watering, aquaculture, and shellfish harvesting that would result from changes in quality or supply of water in or from affected Basin Plan water bodies; inventory of best management practices or project design features or HSR operations that are part of the project to maintain these beneficial uses; and conclusions for impact significance under CEQA and NEPA
- Mitigation Measures—Pertaining to impacts upon these beneficial uses, if any
- Impact Conclusions—Summaries of significant impacts under CEQA and NEPA

Provide specific reference to the appendix in the Agricultural Lands subsection of Chapter 3 to help the reader navigate between volumes.

Analyze direct and indirect impacts related to conversion of agricultural lands through quantitative analysis, and where necessary, with qualitative analysis. Analyze impacts which may occur during construction and operation of the HSR system (*note:* the analytical results for construction impacts and operations impacts will be presented separately in the EIR/EIS). Table 3.14-2 identifies types of construction and operation impacts.

Consider how project design avoids or minimizes impacts to agricultural lands, such as the inclusion of access for rural property owners across the right-of-way at 2-mile intervals or the legal requirement under the right-of-way process to provide access to parcels and avoid landlocked status.

Base the analysis on a review of available reports and data, discussions with agency representatives in the region, field investigation, modeling (where applicable) and professional judgment. Obtain data on existing agricultural lands and uses from federal, state, regional, county, and municipal agencies, resource conservation districts and farm bureaus, and individual property owners or tenants to support analysis of impacts at the parcel level of detail. In some instances, information from individual property owners/business owners may be necessary to adequately assess the project's impacts on agricultural land. Develop GIS databases for each project alignment segment. Develop all GIS data (1) as part of project design or (2) from available federal, state and local sources. DOC spatial data sets from the FMMP identify Important Farmland (i.e., Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance), and Grazing Land. DOC also compiles spatial data for agricultural lands protected under Williamson Act and FSZ contracts. Other GIS resources from NRCS contain spatial data by soil type. Conservation organizations (e.g., land trusts) may also provide information about agricultural conservation easements. DOC data on California Farmland

Conservancy Program easements and the California Conservation Easement Registry can also be used to identify agricultural conservation easements. Provide sufficient detail to allow complete analysis of the anticipated design of the completed project or of reasonable assumptions for project implementation, including structures for grade-separated alignment crossings, maintenance road access, all electrical and utility connections or modifications, wayside and train storage facilities, etc. Focus analysis on the project's potential to alter existing conditions of the affected resources in the RSA(s). Identify where permit applications will be needed and provide analysis to support future permit review (e.g., Williamson Act or FSZ contract amendments; local or regional wastewater collection, treatment, or disposal permits; air pollution control district permits; local conditional use permits or amendments for alteration of discretionary agricultural uses).

Table 3.14-2 Source and Description of Agriculture and Forest Impacts

Source of Impacts	Description of Impacts
Construction activities with potential for impacts to agricultural lands due to temporary or permanent physical change on the landscape by project facilities, such as the guideway and supporting structures, HSR-related infrastructure and facilities, stations, parking structures/lots	▪ Effects of dust and noise on adjacent uses ▪ Noise and vibration effects on animals ▪ Use of land for construction staging, material laydown, and access ▪ Utility and infrastructure interruption ▪ Conversion of Prime, Unique, Statewide Important and Locally Important Farmland to non-agricultural use ▪ Conversion of Forest or Timberland to non-forest use ▪ Partial acquisition of land under Williamson Act or Farmland Security Zone contracts, local zoning or conservation easements ▪ Parcel severance ▪ Severance of access roads to irrigation distribution canals ▪ Loss of structures or associated land used for growing forage crops and/or receiving waste (nutrient distribution) on confined animal facilities
Operational impacts from ongoing rail service and maintenance activities of the HSR system	▪ Effects of dust, noise, and wind on adjacent uses ▪ Interference with aerial spraying of agricultural lands adjacent to the alignment from vertical HSR structures, such as poles, radio communication towers, and elevated guideways ▪ Noise, vibration, or electromagnetic field effects on animals

Review data and impact analyses in the other sections prepared for the EIR/EIS, such as Transportation (e.g., local road closures, access across the HSR alignment); Noise and Vibration (e.g., potential for high noise levels proximate to confined livestock); Public Utilities and Energy (e.g., changes in irrigation water service delivery, access to electrical power); Hydrology and Water Resources (e.g., potential changes in surface water diversions for irrigation supply); Biological Resources and Wetlands (e.g., disruption of use of field crops for wildlife foraging, selection of agricultural lands for habitat mitigation); Socioeconomics and Communities (e.g., impacts on agricultural business and employment); and Regional Growth (e.g., potential change in pattern of non-agricultural development of agricultural lands).

The agricultural lands impact analysis focuses on the conversion of Important Farmlands and forests to nonagricultural and forest use. Consider the factors listed in Table 3.14-3 when evaluating direct and indirect conversion of agricultural lands.

Table 3.14-3 Agricultural Land Conversion Factors

Factor	Considerations	Type of Impact to Agricultural Land			
		Direct Conversion to HSR Use	Indirect Conversion from Parcel Severance or Interference with Agricultural Use	Indirect Conversion from Effects on WA, FSZ, or TPZ Contracts	Indirect Conversion from Dust or Other Environmental Conditions
Land designation and quality	▪ Parcel is Important Farmland ▪ Suitability/fertility of soils for range of Agricultural uses	✓		✓	
Parcel size	▪ Original ▪ Remainder of 20 acres or less	✓	✓	✓	✓
Parcel shape	▪ Agricultural equipment circulation within 25 feet of HSR project footprint ▪ Crop separation ▪ Non-Agricultural use separation	✓	✓		✓
Access ▪ Severed by HSR Alignment ▪ Proximity to grade-separated public or private HSR crossing ▪ To/from parcel ▪ Utilities and other off-site services	▪ Public ▪ Private ▪ Agricultural equipment ▪ Livestock crossing ▪ Wildlife crossing ▪ Canal, drainage, stormwater ▪ Irrigation and well infrastructure ▪ Power/telecommunications	✓	✓		
Adjacent parcels	▪ Size ▪ Shape ▪ Agricultural or Agricultural-related use ▪ Ownership related to original parcel ▪ Access to utilities and services		✓	✓	

Table 3.14-3 Agricultural Land Conversion Factors (continued)

Factor	Considerations	Type of Impact to Agricultural Land: Direct Conversion to HSR Use	Indirect Conversion from Parcel Severance or Interference with Agricultural Use	Indirect Conversion from Effects on WA, FSZ, or TPZ Contracts	Indirect Conversion from Dust or Other Environmental Conditions
Type and scale of agricultural use ▪ Relative sensitivity to disruption, interruption, loss of usable land, location ▪ Relocation ability	▪ Dairy or Livestock ▪ Field crops ▪ Orchards or vineyards ▪ Facilities (processing, feeding, storage, logistics, etc.) ▪ Silviculture	✓	✓	✓	✓
Local plan compliance	▪ Parcel General Plan designation and Zoning District ▪ Adjacent General Plan designation(s) and Zoning District(s) ▪ Parcel or adjacent land within municipal boundary, Sphere of Influence or Pre-Zoning Area		✓	✓	
Agricultural-use contract or easement ▪ Williamson Act (CLCA) ▪ Farmland Security Zone ▪ Agriculture Conservation ▪ Timberland Protection Zone	▪ Minimum parcel size for WA or FSZ contracts under County programs ▪ Minimum agricultural productivity ▪ Non-renewal or tenure status	✓	✓	✓	
Severity of HSR alteration of environmental conditions ▪ Wind ▪ Noise ▪ Dust ▪ Vehicle Emissions	▪ Permanent ▪ Temporary ▪ Relative sensitivity of agricultural use ▪ Distance of sensitive receptor from HSR facility	✓	✓	✓	✓

Table 3.14-3 Agricultural Land Conversion Factors (continued)

Factor	Considerations	Type of Impact to Agricultural Land: Direct Conversion to HSR Use	Indirect Conversion from Parcel Severance or Interference with Agricultural Use	Indirect Conversion from Effects on WA, FSZ, or TPZ Contracts	Indirect Conversion from Dust or Other Environmental Conditions
Location and extent of HSR Property needs ▪ HSR alignment and appurtenant operations, control, communications, security, maintenance and access facilities ▪ HSR-supportive facilities (linear and sited, primarily electrical power and drainage, including maintenance access) ▪ Consequential utility relocation (wet and dry, above and on/in ground) ▪ Construction mobilization, staging, access for HSR and consequential actions	▪ Permanent, temporary or interim HSR needs ▪ Conversion to HSR or related use ▪ Conversion to other non-agricultural use ▪ Landowner preference for retention ▪ Potential for re-conveyance and return to agricultural or agricultural-related use ▪ Preclusion of aerial applications or other economically scaled agricultural management ▪ Regulatory buffers or setbacks from HSR or related use ▪ Tenure of non-agricultural use ▪ Extent/complexity of site or appurtenance restoration for agricultural re-use ▪ Prospects for re-conveyance for agricultural-use ▪ Interim HSR management/maintenance/control ▪ Off-site and indirect impacts ▪ Remainder/remnant	✓	✓	✓	

WA = Williamson Act
FSZ = Farmland Security Zone
TPZ = Timberland Protection Zone

Farmlands

The methodology used to evaluate agricultural land impacts is generally based on Caltrans Standard Environmental Reference, Environmental Handbook Volume 1, Chapter 23—Farmlands (available at www.dot.ca.gov/ser/vol1/sec3/community/ch23farm/chap23farm.htm#laws). Additional analytical resources can be found in the papers prepared by the agricultural technical working group that was created by the Authority to study specific issues related to agriculture and the effects of HSR construction and operation. The working group papers on confined animal facilities, agricultural equipment, induced wind (pollination, bee, dust, and drift), agricultural infrastructure, and irrigation systems are available as resource documents on the Authority website, www.hsr.ca.gov/Programs/Green_Practices/agricultural_conservation.html. Conduct impact analysis and report conclusions at the parcel level of detail. The project footprint for each alternative contains the area that is subject to direct permanent conversion of Important Farmlands to HSR nonagricultural use and the area needed for temporary use of agricultural land for HSR construction. Where Authority ownership will probably not be permanent, analyze potential impacts of site maintenance and control, noxious weed invasion, colonization by special status species, emergence of regulated environmental conditions (e.g., wetlands, stormwater, mosquito breeding), post-construction re-use of staging areas, restoration of agriculture on remnant properties, etc.

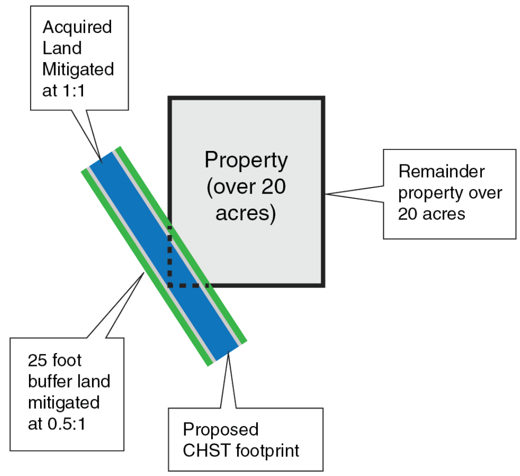
Madera et al v. Authority Settlement Agreement

- Specified the Important Farmland that will be directly and indirectly converted to non-agricultural land
- Specified the mitigation ratios for direct and indirect agricultural land conversions
- Added emphasis to consideration of other indirect causes of land conversion:
  - Non-compliance with conservation contracts or zoning
  - Access or infrastructure severance
  - Regulatory non-compliance

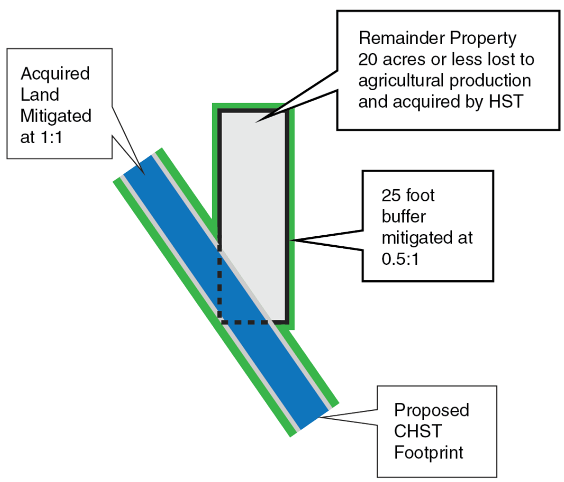
Examine farmland severance on a parcel-by-parcel basis for each alternative to identify where severance would create two or more parcels and result in remainder parcel(s). Explain the mechanisms that connect HSR actions and parcel severance with the probability of farmland conversion, such as a remainder parcel that would be too small or too physically constrained to be farmed economically,[1] or where severed farmland or facilities would probably lead to indirect farmland conversion. The provisions of the Madera Settlement Agreement (April 2013)[2] provide the base assumptions for determining permanent direct and indirect conversion of Important Farmlands to HSR nonagricultural use (i.e., all remainder or remnant parcels of 20 acres or less in size; acreage of the area extending 25 feet outward from the HSR footprint onto Important Farmland). Figure 3.14-1 illustrates the application of the settlement agreement in the farmland conversion analysis. The amount of Important Farmland directly and permanently converted to nonagricultural use for each alternative is the sum of the acreages of

[1] Severed parcels may contain small or irregularly shaped remnants. Where analysts determine, on the basis of substantive, conclusive information that is documented by the EIR/EIS agricultural land impact analysis, that some agricultural use of the remnant property would be likely, those parcels are not added to the acquisition area. For example, small parcels could be consolidated with adjacent landowners and larger, irregularly shaped parcels could still be farmed or used for farming activity. In both examples, substantive and conclusive evidence of likely retention in agricultural use would include explicitly, written interest of original landowner or adjacent landowner to receive property. Note that the intent of this analysis is to determine farmland that could be lost to production. Impacts associated with farm efficiency or property transactions are social and economic effects that do not mean farmland would be lost.

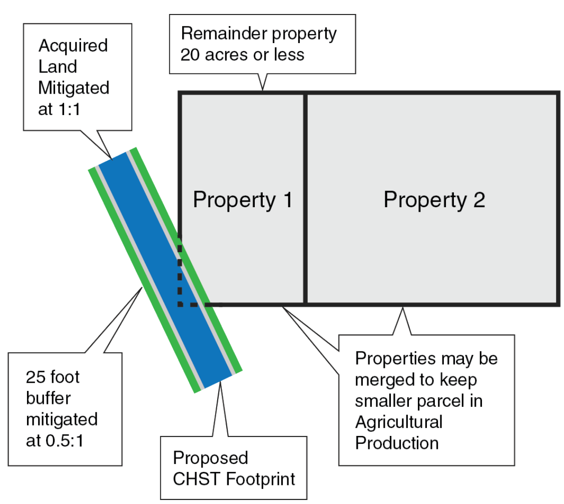
[2] In April 2013, the Authority and several Madera/Merced County agricultural interests reached agreement on the conservation of Important Farmland and the continued viability of agricultural operations. Under the settlement agreement, the Authority agreed, in part, that agricultural land impacts include the direct and indirect conversion of Important Farmland for non-agricultural use as a result of high-speed rail construction. The conversion would include land needed for the project footprint, remainder parcels 20 acres or smaller, and a buffer area extending 25 feet from the project footprint (or adjacent converted remainder parcel). The agreement also specifies that the mitigation ratios for direct and indirect agricultural land conversion be 1:1 for the project footprint and remainder parcels and 0.5:1 for the 25-foot buffer area. The settlement agreement also requires the Authority to assist the re-permitting of regulated agricultural operations that are disrupted by HSR construction or operations.



1. Mitigation for Remainder Parcels Over 20 Acres in Size



2. Mitigation for Remainder Parcel 20 acres or less that does not remain in agricultural production.



3. Mitigation for Remainder Parcels Purchased by nearby land owner or to remain in agricultural production by land owners choice.

Figure 3.14-1 Madera Settlement Agreement Criteria for Conversion of Important Farmland

the project footprint, a 25-foot wide area beyond the project footprint or adjacent property acquired by the Authority, and other noneconomic remnant parcels. Where substantive, conclusive information on retaining remainders in agricultural use is documented by the EIR/EIS agricultural land impact analysis (including, but not limited to, expressed landowner preference for retaining ownership and continuing agricultural use of remnant parcel), the size-based presumption of remainder conversion impact in Section 1 of the Madera Settlement will not apply to the retained remainders.[3] The RC should coordinate with DOC for review and written input regarding the HSR section severance analysis. The full record of coordination with DOC should be contained within a technical appendix.

Evaluate project effects to Williamson Act, FSZ, or TPZ lands by examining of the alternative project alignments and corresponding parcel boundaries on a parcel-by-parcel basis. Evaluate divided and remnant parcels on the basis of conformance with the minimum acreage requirements for Williamson Act and FSZ contracts established by each county. Comply with Williamson Act and FSZ notification requirements by gathering every Assessor's Parcel Number subject to an agriculture preservation contract and obtaining a copy of every contract. (This process is time consuming, and in some instances the county records may be incomplete. If this occurs, consult with Authority staff.) If the remaining portion of a parcel that is presently under a contract does not meet the minimum acreage requirement of the contract or preservation zone, add the affected area to the potential acreage indirectly affected by the project (i.e., where indirect conversion of agricultural land is controlled by a private property owner, not the Authority, even if the proposed HSR alternative is a catalyst for conversion).

The analysis of agricultural land severance requires professional judgment for determining the viability of continued agricultural use of remnant property or likely conversion to non-agricultural use. The analyst must be licensed with the California Department of Consumer Affairs Bureau of Real Estate Appraisers. The analyst must also have recent experience in appraising agricultural real estate in the Central Valley, with particular expertise in agricultural land appraisal within the RSA, and experience in transportation or other public infrastructure land transactions.

After evaluating changes to Important Farmland, conduct a farmland conversion impact rating of project alternatives in collaboration with NRCS staff using Form NRCS-CPA-106 in accordance with FPPA criteria (e.g., area of nonurban use, percentage of the HSR corridor being farmed, protected farmland, size of farm, creation of non-farmable farmland, availability of farm support services, on-farm investments, and compatibility with existing agricultural uses). Combine the scores for both the land evaluation and site assessment portions of Form NRCS-CPA-106 to arrive at a total score for each alternative. The maximum possible score is 260 points. If the score is less than 160 points, no further evaluation is necessary under the FPPA. If the score is greater than 160, the FPPA requires consideration of alternatives that avoid or minimize farmland impacts. It does not, however, mandate the adoption of such alternatives. Evaluation materials and data resources are compiled in Volume 2 Appendix 3.14-A of the EIR/EIS.

Include the following information in the environmental document:

- A detailed map of sufficient scale to illustrate the geographic relationship of the alternatives to agricultural properties
  - Ensure the map boundary does not exceed the extent of a project segment and clearly shows the location and areal extent of project impacts and major landscape features (e.g., highways, major roads, local jurisdictions, perennial water bodies, or other geographical landmarks or features that convey relative location and size).

[3] Practical application of the Madera Settlement in the context of EIR/EIS preparation and early right-of-way analysis is a new practice, which will require further evaluation and likely refinement. Consult with PMT and Authority staff on specific questions/issues related to applying the Madera Settlement agreement requirements. Scenario-based information for the *Merced to Fresno Section Central Valley Wye SEIR/SEIS* can be found in the PMT memorandum, *Evaluation of Agricultural Lands; Response to Right-of-Way Questions* (May 22, 2014).

   - Obtain Authority, FRA, and PMT concurrence on mapping scale before preparing an administrative draft EIR/EIS.

- Size (acres) and location (e.g., maps or other exhibits such as photographs) of the affected agricultural property
- Function or type of agricultural activities on affected property
- Relevant property ownership or use constraints, such as lease, easement, covenants, restrictions, or conditions, including forfeiture and Williamson Act contracts
- Summary of appropriate information from the Farmland Conversion Impact Rating for Corridor-Type Projects Form NRCS-CPA-106 as part of the farmland determination

Forestland

The methodology used to evaluate forest land impacts generally follows the criteria established in Appendix G of the CEQA Guidelines. The criteria focus on conflicts with existing zoning, re-zoning, and loss or conversion of forest or timberland. As an additional source of guidance, and where applicable, the information provided by the California Department of Forestry and Fire Protection can be used to consider additional impacts. To evaluate the effects of forest land conversion, the methodology used to assess impacts to farmlands can be used. The method uses the farmland conversion impact rating of project alternatives in collaboration with NRCS staff using Form NRCS-CPA-106 in accordance with the FPPA criteria.

Agency, Public, and Landowner Coordination

Agency, public, and landowner input during the HRS project EIR/EIS scoping process can inform the agricultural land impact analysis. Comments and other input from public and stakeholder outreach can help to define the range of possible impacts to consider in the EIR/EIS for lands adjacent to the HSR, including disruption of adjacent agricultural operations (e.g., orchards, dairies, crop spraying, irrigation, equipment access) from dust, noise, and wind. Outreach should also be implemented through other forms of communication. For example, on requests for permission to enter to conduct surveys on biological or cultural resources, or geotechnical or other land conditions, or other correspondence, include inquiry about individual agricultural operations or uses. Inquire about the landowner's preference for retention of remnant parcel(s) in correspondence to owners of property that may be severed by acquisition of fee or easement needed to implement an HSR alignment. Conduct outreach activities in compliance with the Authority's stakeholder protocols and document in Chapter 9, Public and Agency Involvement. Include a brief inventory of outreach activities for agricultural lands within the project segments as follows:

- Technical working group meetings with federal, state, and local agency staff, including early coordination with NRCS, U.S. Forest Service, and Bureau of Land Management
- Agricultural workshop meetings with city, county, irrigation/water district, resource conservation district, or other local agency staff
- Meetings with each county's Farm Bureau within the project segments
- Community or landowner educational workshops
- Consultation with landowners of potentially severed property, particularly where the area of remnant parcels would be 20 acres or less.

For all impacts, determine significance of impacts based on the application of the following methods under NEPA and CEQA.

3.14.4.3 Method for Determining Significance under NEPA

FRA's Procedures for Considering Environmental Impacts (64 Fed. Reg. 28545) require assessment of irreversible or irretrievable commitments of natural resources (Section 14(n)(11)). Agricultural lands are not replaceable, and therefore any permanent conversion of Important Farmland or forests is a permanent depletion of the resource. Evaluate indirect effects (e.g., from noise or induced winds) in terms of their contribution to farmland or forest conversion. Indirect effects may increase the amount of agricultural land conversion from the project footprint, resulting in additional farmland and forest losses. Indirect impacts that result in economic or social effects, but not additional farmland or forest conversion, are not agricultural land impacts.

Use professional judgment when considering the context, intensity, and duration of an effect, and implementation of mitigation measures to determine the significance of impacts. All relevant aspects of context (e.g., existing resource conditions, resource sensitivity) and appropriate factors of intensity (e.g., extent of change, duration of change) must be considered for determining impact significance. Project actions that improve or otherwise benefit resource values must also be considered in the evaluation of impact significance. For example: *the conversion of farmland to install a new electric power substation for HSR traction power may also extend electrical power to presently unserved locations or enable the reconfiguration of existing individual overhead power lines that presently conflict with orchard canopy or interfere with field equipment movement.*

3.14.4.4 Method for Determining Significance under CEQA

Based on CEQA Guidelines, the project would have a significant impact on agricultural lands and forest resources if it would:

- Convert Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or Locally Important Farmland (collectively "Important Farmland") as shown on the maps prepared pursuant to the Farmland Monitoring and Mapping Program of the California Resources Agency, to a non-agricultural use
- Conflict with existing zoning for agricultural use, or a Williamson Act contract, in a manner that would result in conversion of Important Farmland to non-agricultural use
- Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Cal. Public Res. Code, § 12220(g)), timberland (as defined in Cal. Public Res. Code, § 4526), or timberland zoned Timberland Production (as defined by Cal. Gov. Code. § 51104(g))
- Result in the loss of forest land or conversion of forest land to non-forest use
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Important Farmland, to non-agricultural use or conversion of forest land to non-forest use

3.14.5 Affected Environment

Include a concise summary description of existing farmlands and forests along the proposed HSR alignments and at proposed HSR facilities. In particular:

- Identify all relevant farmlands and forests. A map may be created to illustrate the locations of farmland and forest resources, alternatives, and proposed mitigation measures.
- Document established local policies concerning the context of impacts related to agricultural lands.
- Describe pertinent stakeholder issues and concerns from public outreach efforts and personal contact with local agencies.

- Cross-reference all sections of the EIR/EIS that describe the resources or are related to the resources (e.g., Station Planning, Land Use and Development section or Transportation section).

Table 3.14-4 lists key information needed for a complete description of the Affected Environment and typical sources for the information.

Table 3.14-4 Key Information and Sources for Affected Environment

Key Information	Sources
▪ Existing farmlands (describe consultation done to identify them) ▪ Agricultural conservation easements ▪ Prime Farmlands, Farmlands of Statewide Importance, Farmlands of Local Importance and Unique Farmlands as established by the Department of Conservation and Williamson Act contract lands ▪ Other lands subject to FPPA requirements including forest land, pastureland, cropland, or other land ▪ Agricultural preservation zones (e.g., Farmland Security Zones, Timberland Production or Protection Zones) ▪ Agricultural preservation contracts (e.g., Williamson Act, Farmland Security Zones, Timberland Production or Protection) ▪ Resource Conservation Districts, as established by the Department of Conservation	▪ Local jurisdiction general plans ▪ County Assessor's records ▪ U.S. Bureau of the Census (agricultural census data) ▪ Farmland Mapping and Monitoring Program database ▪ County Farm Bureaus ▪ University of California Cooperative Extension Service (farm advisors) ▪ Natural Resources Conservation Service ▪ American Farmland Trust ▪ California Farmland Conservancy Program easements ▪ California Conservation Easement Registry ▪ Geographic Information System (GIS)

3.14.6 Environmental Consequences

General formatting and terminology for constructing the discussion of environmental consequences is provided in Section 3.0.6, Environmental Consequences. The following direction is specific for the evaluation of Agricultural Lands. The heading structure for the Agricultural Lands EIR/EIS discussion is shown in Section 3.14.11 of this methodology.

Give each impact a number and short descriptive title, for example: *Impact AG # 1, Use of Agricultural Farmland for construction of HSR infrastructure would not permanently convert farmland to transportation use because the land would be restored to its pre-construction condition.* Explain the results of the analysis prescribed in Section 0. In particular, describe how the activity or physical change causes an impact upon the resource, reaching specific, separate conclusions about significance for each impact based on the significance criteria and methods defined for NEPA and CEQA in Section 0. For example:

> *Some agricultural land outside of the permanent right-of-way would be used for construction activities, such as staging areas and material laydown areas. This land would be leased from the landowner and used for 1 to 3 years for construction. After construction, the land would be restored by the design/build contractor to as close to its pre-construction condition as possible. These impacts are less than significant under NEPA and under CEQA because the land would be used temporarily and restored, and would not be permanently converted to a nonagricultural use.*

Simplify impact discussions whenever possible with references or citations to the more detailed information in the appendices. Use tables whenever possible to summarize the impacts and simplify the text.

3.14.7 Mitigation Measures

General formatting and terminology for constructing the discussion of mitigation measures is provided in Section 3.0.7, Mitigation Measures. The following direction is specific to Agricultural Lands. Present the mitigation measures associated with project alternatives within each geographic segment under the subheadings of Construction Impacts and Operations Impacts. The heading structure for the Agricultural Lands EIR/EIS discussion is shown in Section 3.14.11. Give each mitigation measure a short descriptive title and a number, such as *AG-MM#1*, which corresponds to the primary significant impact for which the measure is proposed (if practical).

Develop project-level measures that are consistent with adopted program and project strategies that avoid or minimize impacts. Begin by considering programmatic mitigation strategies described in the general methodology and the agricultural lands-related technical reports and environmental document sections in most recent environmental documents produced by the Authority (e.g., *Fresno to Bakersfield Section Final EIR/EIS*, or more recent HRS project EIR/EIS), as applicable to the HSR project section.

Refine the general mitigation strategies into project-level, project-specific mitigation measures that are coupled to project-level and specific impacts. Identify section-specific measures to mitigate any significant impacts, such as purchase of agricultural conservation easements to compensate for loss of farmland or fee purchase of remnant acreage that is not suitable for agricultural uses.

Draft mitigation measures to facilitate transition into the Mitigation Monitoring and Enforcement Plan by clearly identifying responsibility and timing for implementation, as appropriate. Ag-MM #1 in the *Fresno to Bakersfield Section Final EIR/EIS* provides an example of mitigation associated with farmland preservation.

> *Ag-MM #1: Preserve the Total Amount of Prime Farmland, Farmland of Statewide Importance, Farmland of Local Importance, and Unique Farmland.*
>
> *The Authority has entered into an agreement with the DOC California Farmland Conservancy Program to implement agricultural land mitigation for the High-Speed Rail Program. The Authority will fund the California Farmland Conservancy Program's work to identify suitable agricultural land for mitigation of impacts and to fund the purchase of agricultural conservation easements from willing sellers in the Fresno to Bakersfield Section. The California Farmland Conservancy Program will work with local, regional, or statewide entities whose purpose includes the acquisition and stewardship of agricultural conservation easements. The Authority and California Farmland Conservancy Program will develop selection criteria under their agreement to guide the pursuit and purchase of conservation easements. These will include, but are not limited to, provisions to ensure that the easements will conform to the requirements of Public Resources Code Section 10252 and to prioritize the acquisition of willing seller easements on lands that are adjacent to other protected agricultural lands or that would support the establishment of greenbelts and urban separators.*
>
> *The performance standards for this measure are to preserve Important Farmland in an amount commensurate with the quantity and quality of the converted farmlands, within the same agricultural regions as the impacts occur, at a replacement ratio of not less than 1:1 for lands that are directly and permanently converted to nonagricultural use by the project. The Authority will provide additional Important Farmland mitigation acreage, above the 1:1 ratio minimum,*

> *at a level consistent with the terms of the settlement agreement the Authority reached with agricultural interests in County of Madera, et al. v. California High-Speed Rail Authority. This approach will provide a consistent protocol for calculating the total amount of acres of agricultural conservation easements across the Central Valley.*
>
> *The likely effectiveness of this mitigation measure is indicated by the nationwide and local success of farmland preservation programs using agricultural conservation easements and the experience of the DOC California Farmland Conservancy program (DOC 2010a). However, because the mitigation does not anticipate the creation of new farmland (e.g., conversion of natural lands to agriculture), the mitigation measure would not reduce impacts to a less-than-significant level.*

3.14.8 Impacts from Implementing Mitigation Measures

General guidance for constructing the discussion of impacts from implementing mitigation measures is provided in Section 3.0.8, Impacts from Implementing Mitigation Measures.

Consider and disclose both positive and negative impacts of mitigation measures as part of the environmental analysis. Continuing with the previous example of Ag-MM #1 in the *Fresno to Bakersfield Section Final EIR/EIS:*

> *The above mitigation would place lands that are currently not under any type of farmland conservation easement into a new easement that would permanently protect the farmland from future conversion to nonagricultural uses. As no farmland is being converted as a result of the mitigation, there are no adverse agricultural land impacts. The mitigation measure would instead create a beneficial impact by preserving agricultural land in perpetuity for agricultural use. The agricultural land conversion easements will maintain current use; therefore no other adverse secondary impacts are anticipated.*

Make reasonable assumptions about the potential amount and type of land required and note the impacts caused by the conversion, such as ability to continue agricultural use of remainder or remnant property, potential for relocation of agricultural uses, shifts in transportation patterns or needs, or changes in public utility or other supportive infrastructure (may be positive or negative). Evaluate all mitigation measures, including off-site measures, using the methods in Section 0. Determine probable impacts using actual, on-the-ground analysis and describe the substantial basis for analytical conclusions (including defined thresholds or other criteria). When the impacts of mitigation measures cannot be quantified (e.g., at a specific location, in a definite extent, at a particular time or duration, or measurable alteration of the affected resource), evaluate potential impacts using clearly described assumptions based upon reasonably foreseeable outcomes.

3.14.9 Impacts Summary

3.14.9.1 NEPA Impacts

The overall structure and content of this discussion is presented in Section 3.0.9.1, NEPA Impacts. The heading structure for this organizational scheme is shown in Section 3.14.11. Use maps, as appropriate, to show locations of significant impacts of alternatives by segment.

3.14.9.2 CEQA Significance Conclusions

The overall structure and content of this discussion is presented in Section 3.0.9.2, CEQA Significance Conclusions. The heading structure for this organizational scheme is shown in Section 3.14.11. Use maps, as appropriate, to show locations of significant unavoidable impacts of alternatives by segment.

3.14.10 Products

The RC is responsible for preparing the following products, under Authority and FRA direction, according to PMT guidance and subject to PMT quality control and assurance.

3.14.10.1 Technical Report or Appendix

In addition to the Volume 1 impacts analysis chapter, provide technical reports or Volume 2 appendices where full analysis applicable to the HSR project section requires details in excess of efficient inclusion in the EIR/EIS Volume 1 chapter. For example:

1. Volume 2, Appendix 2-E, Project Impact Avoidance and Minimization Features Analysis
2. Volume 2, Appendix 3.1-B, Regional and Local Policy Inventory
3. Volume 2, Appendix 3.14-A, Results and Findings of Land Evaluation and Site Assessment Pursuant to Farmland Preservation Policy Act
4. Volume 2, Appendix 3.14-B, Effects on Confined Animal Agriculture
5. Volume 2, Appendix 3.14-C, Williamson Act, Farmland Security Zone, Timberland Protection Zone Compliance Data
6. Volume 2, Appendix 3.14-D, Policy Consistency Table Appendix
7. Volume 2, Appendix 3.14-E, Agricultural Lands Technical Report (including Agricultural Land Severance)

3.14.10.2 Project EIR/EIS Volume 1

1. Summary/Table for EIR/EIS Executive Summary
2. Project Description—Agricultural Lands-related Components
    a. Program Impact Avoidance and Minimization Features
    b. Summary Table of Impact Avoidance and Minimization Features, and Project Impacts
3. Affected Environment, Environmental Consequences and Mitigation Measures Section: Agricultural Farmland and Forest Land
4. Affected Environment, Environmental Consequences and Mitigation Measures Section: Cumulative Impacts

3.14.11 Agricultural Farmland and Forest Land EIR/EIS Outline

The RC will use the following outline for organizing content related to Agricultural Farmlands and Forest Land in Chapter 3 of the project EIR/EIS, using the heading hierarchy and format as indicated. The RC will consider the impacts of implementing mitigation measures in Section 3.14.7.

3.14 Agricultural Farmland and Forest Land
- 3.14.1 Introduction
- 3.14.2 Laws, Regulations and Orders
    - 3.14.2.1 Federal
    - 3.14.2.2 State
    - 3.14.2.3 Regional and Local
- 3.14.3 Regional and Local Policy Analysis

3.14.4 Methods for Evaluating Impacts
- 3.14.4.1 Definition of Resource Study Area
- 3.14.4.2 Method for Determining Significance under NEPA
- 3.14.4.3 Method for Determining Significance under CEQA

3.14.5 Affected Environment
- 3.14.5.1 Project Segment 1
  - Alternative 1
  - Alternative 2
  - Alternative 3
  - Alternative N
- 3.14.5.2 Project Segment 2
  - Alternative 1
  - Alternative 2
  - Alternative 3
  - Alternative N
- 3.14.5.3 Project Segment 3
  - Alternative 1
  - Alternative 2
  - Alternative 3
  - Alternative N
- 3.14.5.4 Project Segment N
  - Alternative 1
  - Alternative 2
  - Alternative 3
  - Alternative N

3.14.6 Environmental Consequences
- 3.14.6.1 Overview
- 3.14.6.2 Project Segment 1
  - No Project
  - Alternative 1
    - Construction Impacts
    - Operations Impacts
  - Alternative 2
    - Construction Impacts
    - Operations Impacts
  - Alternative 3
    - Construction Impacts
    - Operations Impacts
  - Alternative N
    - Construction Impacts
    - Operations Impacts
- 3.14.6.3 Project Segment 2
  - No Project
  - Alternative 1
    - Construction Impacts
    - Operations Impacts
  - Alternative 2
    - Construction Impacts
    - Operations Impacts
  - Alternative 3
    - Construction Impacts
    - Operations Impacts

Alternative N
Construction Impacts
Operations Impacts
3.14.6.4 Project Segment 3
No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.14.6.5 Project Segment N
No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.14.7 Mitigation Measures
3.14.7.1 Project Segment 1
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.14.7.2 Project Segment 2
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures

Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.14.7.3 Project Segment 3
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.14.7.4 Project Segment N
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.14.8 NEPA Impact Summary
3.14.8.1 Alternative 1
Construction Impacts
Operations Impacts
3.14.8.2 Alternative 2
Construction Impacts
Operations Impacts
3.14.8.3 Alternative 3
Construction Impacts
Operations Impacts
3.14.8.4 Alternative N
Construction Impacts
Operations Impacts
3.14.9 CEQA Significance Conclusions
3.14.9.1 Alternative 1
Construction Impacts
Operations Impacts
3.14.9.2 Alternative 2
Construction Impacts
Operations Impacts

3.14.9.3 Alternative 3

Construction Impacts

Operations Impacts

3.14.9.4 Alternative N

Construction Impacts

Operations Impacts

3.15 Parks, Recreation, and Open Space

The methodology guidelines in this section are organized by a sequence of steps for preparing an environmental document. Section 3.15.11 provides an outline for this environmental impact report/environmental impact statement (EIR/EIS) section.

Section 3.0, General Methodology Guidance for Resource Sections, provides the methodological framework common to the evaluation of all resource areas. Section 3.19, Cumulative Impacts, provides the cumulative impact analysis methodology. Use Section 3.0 and Section 3.19 in combination with this Parks, Recreation, and Open Space guidance section when developing the EIR/EIS analyses.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the resource section. Example text that illustrates the concepts and methods is shown in *italics*. The methods are organized to mirror the organization of the EIR/EIS section or chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

If there is a discrepancy between the material in this guidance and any adopted federal or state agency guideline or manual applicable to parks, recreation, and open space, the agency guideline and manual controls. Identify and discuss any discrepancy with the California High-Speed Rail Authority (Authority), Federal Railroad Administration (FRA), and the Program Management Team (PMT) before deviating from this guidance.

3.15.1 Introduction

The general method for preparing an introduction for this resource section is provided in Section 3.0.1, Introduction. The following discussion is specific to Parks, Recreation, and Open Space.

Refer to related content in other sections of the EIR/EIS that influence or are influenced by the Parks, Recreation, and Open Space impact analysis (e.g., Noise, Visual, Socioeconomic, Agricultural Lands, Land Use and Regional Growth, Cumulative, Section 4(f), and Section 6(f), and supportive/associated technical documents). References to other documents must include citations to specific sections (by lowest heading tier, e.g., 3.X.X), not just a general reference to a Chapter in the EIR/EIS.

3.15.2 Laws, Regulations, and Orders

Federal, state, and local laws, regulations, orders or plans germane to parks, recreation, and open space in the geographic area that is affected by the project are presented below. General National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) requirements for assessment and disclosure of environmental impacts are described in Section 3.1, Introduction, and are therefore not restated in this resource section.

3.15.2.1 Federal

Section 4(f) of the U.S. Department of Transportation Act (23 U.S.C. § 138 and 49 U.S.C. § 303)

Section 4(f) of the U.S. Department of Transportation Act Declares that "it is the policy of the United States government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites." It specifies that the Secretary may approve a transportation program or project (other than any project for a park road or parkway under Section 204 of Title 23) requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance (as determined by the federal, state, or local officials having jurisdic-

tion over the park, area, refuge, or site) only if (1) there is no prudent and feasible alternative to using that land and (2) the program or project includes all possible planning to minimize harm to the Section 4(f) property resulting from the use.

In addition, 49 U.S.C. § 303(d) sets standards for concluding potential *de minimis* impacts for Section 4(f) resources. In general, a *de minimis* impact is a minimal impact to a Section 4(f) resource that is not considered to be adverse to the statute's preservationist purpose. For parks, recreation areas, and wildlife and waterfowl refuges, a *de minimis* impact determination can be made after public notice and opportunity to comment where the Federal Railroad Administration (FRA) finds an impact that will not adversely affect the qualities or activities that give the property protection under Section 4(f) and where FRA receives written concurrence in that finding from the official with jurisdiction over the resource.

Section 6(f) of the Land and Water Conservation Fund Act (16 U.S.C. § 460l-8(f) and 36 C.F.R. Part 59.1)

State and local governments often obtain grants through the Land and Water Conservation Fund Act to acquire or make improvements to parks and recreation areas. Section 6(f) of the act prohibits the conversion of property acquired or developed with these grants to a non-recreational purpose without the approval of the U.S. Department of the Interior's National Park Service (NPS). Section 6(f) directs the Department of the Interior to ensure that replacement lands of comparable value and function, or monetary compensation (used to enhance the remaining land), location, and usefulness are provided as conditions to such conversions.

National Park Service Organic Act (16 U.S.C.)

The National Park Service Organic Act created NPS to administer the nation's national parks, which are areas of national significance afforded special recognition and protection in accordance with various acts of congress. The act also set the purpose of the park system: "The fundamental purpose of the parks is to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." NPS is required to keep park units in an unimpaired state in perpetuity and to provide the highest quality of use and enjoyment of the entire system by visitors today and in the future. Areas in parks designated as natural zones must be managed to ensure that natural ecological processes operate unimpaired unless otherwise specifically provided for in the law creating them, and NPS is required to manage native animal life for its essential role in natural ecosystems. Historic zones must be managed to provide full protection for cultural resources.

Wilderness Act (16 U.S.C. §§ 1131–1136)

The Wilderness Act established a National Wilderness Preservation System to be comprised of federally owned areas designated by congress as "wilderness areas." The system is to be administered for the use and enjoyment of the American people in such manner as will leave those areas unimpaired for future use as wilderness and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness.

National Trails System Act (Public Law 90-543, as amended through Public Law 109-418)

The National Trails System Act instituted a national system of recreation, scenic, and historic trails by designating the Appalachian Trail and the Pacific Crest Trail as the initial components of that system and by prescribing the methods and standards according to which additional components may be added to the system.

3.15.2.2 State

California Public Park Preservation Act (Cal. Public Res. Code, §§ 5400–5409)

The California Public Park Preservation Act provides that a public agency that acquires public parkland for non-park use must either pay compensation that is sufficient to acquire substantially equivalent substitute parkland or provide substitute parkland of comparable characteristics.

California Coastal Act (Cal. Public Res. Code, §§ 30000–39000) (only applicable to sections within or affecting coastal zone)

The California Coastal Act applies to all projects significantly affecting areas under the control of the State Coastal Zone Management Agency. Before approval is granted, a consistency determination with the approved Coastal Zone Management Plan or Local Coastal Program is required.

California Department of Fish and Wildlife Ecological Reserves (Cal. Fish and Game Code, § 1580 et seq. and Cal. Code Regs,. tit. 14, § 630)

This legislation specifies areas as ecological reserves and establishes protections for resources in these areas.

3.15.2.3 Regional and Local

Compile a complete inventory of adopted local and regional plans, ordinances, or guidelines related to parks, recreation, and open space. Open space includes any greenbelts, wilderness areas, and wildlife and waterfowl refuges. Use a tabular format similar to that used in the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014), or more recent high-speed rail (HSR) project EIS/EIR, to organize and concisely report this information. This information will become part of Volume 2 Appendix 3.1-B Regional and Local Policy Inventory.

- County or municipal general plans or community plans
  - Open space, parks and recreation, aesthetics, land use, conservation, or other similar elements of the general plan
- County or municipal parks and recreation master plans
- Comprehensive plans, specific plans, redevelopment plans (as applicable/enforceable)
- County or municipal jurisdiction ordinances and codes
  - Zoning ordinances, development regulations, and codes
- Local coastal programs and local coastal programs regulations (as applicable to sections within or affecting coastal zone)

3.15.3 Regional and Local Policy Analysis

The overall structure of this discussion is presented in Section 3.0.3, Regional and Local Policy Analysis. As described in more detail in subsection 3.0.3.2, this analysis will describe any inconsistencies or conflicts with adopted regional or local policies and implementation of the HSR project.

3.15.4 Methods for Evaluating Impacts

Evaluation of impacts on public parks, recreation, and open space is a requirement of Section 4(f) of the U.S. Department of Transportation Act, California Public Park Preservation Act, NEPA and CEQA, and FRA's *Procedures for Considering Environmental Impacts* (64 Fed. Reg. 28545). Describe existing and planned park, recreation, and open space areas and facilities based on information available from regulatory documents, technical reports, site reconnaissance, and outreach with the appropriate agencies. In addition, describe prior and on-going efforts to avoid

and minimize impacts to parks, recreation, and open space, including reference to impact avoidance and minimization features described in Section 2.5.2, HSR Build Alternatives. Describe the methodology for developing the resource study area (RSA) and for evaluating effects under NEPA and CEQA.

3.15.4.1 Definition of Resource Study Area

The RSA is the area in which all environmental investigations specific to parks, recreation, and open space are conducted to determine the resource characteristics and potential impacts of the HSR project. The factors making up the RSA and the description of the elements comprising the RSA (including an illustrative figure) are provided in Section 3.0.4.1, Definition of Resource Study Area, and Section 3.0.4.2, Methodology for Impact Analysis.

The boundaries of the RSA for parks, recreation, and open space extend beyond the project footprint. For direct impacts on parks, recreation, and open space, the study area is the project footprint, as described in Chapter 2, Alternatives, plus 1,000 feet from the proposed track centerline, 0.5 mile from an HSR station, 0.5 mile from a maintenance facility site, and 1,000 feet from any road construction required to implement the HSR system. The RSA for cumulative impacts will be a larger area depending on the project section and will consider adjacent HSR project sections to ensure a broad consideration of impacts on a more regional and statewide basis. See Section 3.19, Methodology for Cumulative Impacts, for a more detailed discussion.

Parks, recreation and open space resources include one or more of the following—parks and open spaces, including greenbelts, wilderness areas, and wildlife and waterfowl refuges; pedestrian and bicycle trails (does not include bike lanes and routes); playfields; and school district play areas available for public use during non-school hours. Table 3.15-1 presents the information sources and baseline metrics to help define the RSA.

Table 3.15-1 Environmental Resource Study Area Information

Required Information	Resource Study Area
▪ Project description—HSR system, linear and sited facilities, stations, operations, ancillary improvements ▪ Conceptual engineering plans and profiles ▪ Aerial maps, geographic information system (GIS) base ▪ Right-of-way data showing parcel acquisitions ▪ Local and regional plans, in particular Open Space, Parks and Recreation, Aesthetics, Land Use, Conservation, or other similar elements of local general plans ▪ Local and regional parks master plans ▪ Local and regional bicycle plans ▪ Regional planning documents (Regional Transportation Improvement Program, Coastal Zone Management Plan, etc.) ▪ Scoping comments related to parks, recreation, and open space concerns and issues.	▪ 1,000 feet on either side of the project footprint; 0.5 mile from an HSR station, maintenance sites, and other support facilities (e.g., power substations), and access points; and 1,000 feet from any road construction required to implement the HSR system ▪ In areas where an existing transportation corridor separates resources such as parks, school facilities, recreational facilities, and open space from project components, the 1,000-foot study area for direct impacts does not extend beyond these transportation rights-of-way where they provide a barrier to potential direct impacts on park and recreation resources. However, the study area for indirect impacts such as visual quality, noise and vibration, and air quality may not be not limited by these barriers and will be addressed to the full 1,000-foot study area. ▪ Refer to other sections of the EIR/EIS as appropriate for impacts related to or influencing parks, recreation, and open space resources.

3.15.4.2 Methodology for Impact Analysis

Begin analysis of impacts with consideration of impact avoidance and minimization features that are incorporated into the project in Section 2.5.2, HSR Build Alternatives and evaluated in Volume 2, Appendix 2-E. Refer to the summary table of impact avoidance and minimization features and explain how particular features avoid impacts or ensure less-than-significant impacts to parks, recreation, and open space resources.

Summarize information and discussion to effectively present content to the lay audience (i.e., by distinct resource characteristic or component, such as open spaces, parks, greenbelts, trails, playfields, and school district play areas). Focus the parks, recreation, and open space impact analysis on project effects to access and use of these resources. Present detailed impact information such as parks, recreation, and open space acquisitions in an EIR/EIS Volume 2 appendix. Prepare the following information pertaining to the list of Basin Plan water bodies in Section 3.8.5. This information will be compiled in a Volume 2 technical appendix with all other information from Chapter 3 that is related to impacts upon beneficial uses of Basin Plan waters within the RSA to inform the Clean Water Act Section 401 Certification.

- Environmental Consequences—Assessment of potential impacts upon water contact, non-water contact, commercial and sport fishing that would result from changes in quality or supply of water in or from affected Basin Plan water bodies; inventory of best management practices or project design features or HSR operations that are part of the project to maintain these beneficial uses; and conclusions for impact significance under CEQA and NEPA
- Mitigation Measures—Pertaining to impacts upon these beneficial uses, if any
- Impact Conclusions—Summaries of significant impacts under CEQA and NEPA

Provide specific reference to the technical appendices in the parks, recreation, and open space section of Chapter 3 to help the reader navigate between volumes.

Analyze direct and indirect impacts related to parks, recreation, and open space through quantitative analysis and, where necessary, with qualitative analysis. Analyze impacts which may occur during construction and operation of the HSR system (*note*: the analytical results for construction impacts and operations impacts are presented separately in the EIR/EIS). Table 3.15-2 identifies sources and types of construction and operation impacts.

Base the analysis on a review of available reports and data (including federal and state statutes, resource agency, local, and regional agency policies and ordinances), discussions with federal, state, and local agency representatives in the region, field investigation, modeling (where applicable), and professional judgment. Resources for identifying federally protected properties include the NPS, U.S. Forest Service, and Bureau of Land Management.

Develop GIS databases for each project segment. Develop all GIS data (1) as part of project design or (2) from available federal, state, and local sources. Provide sufficient detail to allow complete analysis of the anticipated design of the completed project or of reasonable assumptions for project implementation, including structures for grade-separated alignment crossings and water crossings, maintenance road access, all electrical and utility connections or modifications, maintenance and train storage facilities, etc. Discuss the current level of use. Focus the analysis on the project's potential to alter existing conditions of the affected resources in the RSA(s).

Prepare detailed mapping of sufficient scale to illustrate the geographic relationship of the alternatives to parks, recreation, and open space properties. Ensure the map boundary does not exceed the extent of the project segment and clearly shows the location and areal extent of project impacts and major landscape features. Obtain Authority, FRA, and PMT concurrence on mapping scale before preparing an administrative draft EIR/EIS section.

Table 3.15-2 Source and Description of Parks, Recreation, and Open Space Impacts

Source of Impacts	Description of Impacts
Construction activities with potential for impacts to parks, recreation, and open space; physical impact on the landscape by project facilities such as the stations, parking structures/lots, support facilities, and columns supporting elevated structures	▪ Air emissions ▪ Noise and vibration nuisance ▪ Changes to access and circulation ▪ Reduction in parking capacity ▪ Visibility of construction equipment and HSR facilities ▪ Disruptions in established community and visitor use ▪ Amount of resource land that would be used or acquired during construction ▪ Barriers to or changes in access
Operational impacts along the alignment and at stations from the HSR system	▪ Air emissions ▪ Noise and vibration nuisance ▪ Changes in access and circulation ▪ Facilities and functions that would be affected ▪ Increased or decreased use of the resource ▪ Substantial physical deterioration of the resource's facilities and functions

The methodology used to evaluate parks, recreation, and open space impacts is generally based on CEQA and NEPA requirements for assessment and disclosure of impacts. Include a review of the data and impact analyses in the other sections prepared for the EIR/EIS, such as Section 3.2, Transportation, 3.3, Air Quality and Global Climate Change, Section 3.4, Noise and Vibration, Section 3.11, Safety and Security, and Section 3.16, Aesthetics and Visual Quality, to determine if there would be any indirect impacts on parks, recreation, and open-space resources.

Determine construction impacts using the following methods:

- Evaluate GIS spatial analysis to determine the distance of parks, recreation, and open-space facilities from the project; the amount of park, recreation, or open-space land that would be acquired; and facilities and functions that would be affected as a result of the project.
- Review and analyze proposed construction, right-of-way plans, and station plans to determine whether the resource property will be temporarily or permanently acquired.
- Review and analyze proposed construction right-of-way to determine if there are temporary changes to access and a reduction in parking capacity for parks, recreation, and open-space resources.
- Examine the potential disruption of established community and visitor use of parks, recreation, and open-space resources because of temporary construction easements and general construction activity.
- Review and analyze the design and location of project elements to determine if any barriers to park access and use would be created or changes in access and parking for parks, recreation, and open-space resources would occur.

Determine operations impacts using the following methods:

- Review and analyze the other EIR/EIS sections, including Section 3.3, Air Quality and Global Climate Change, Section 3.4, Noise and Vibration, and Section 3.16, Aesthetics and Visual

Quality, to determine if there would be any indirect impacts on parks, recreation, and open-space resources as a result of project operation.

- Review and analyze Section 3.13, Station Planning, Land Use, and Development, and Section 3.18, Regional Growth, to determine if there would be any project related increase or decrease in the use of parks, recreation, and open-space resources such that substantial physical deterioration of the resource would occur or be accelerated.

3.15.4.3 Method for Determining Significance under NEPA

As described in more detail in Section 3.0.4.3, NEPA does not provide a definitive threshold to determine significant or potentially significant impacts to parks, recreation, and open space lands. In cases where there are no defined thresholds, professional judgment is used when considering the resource context, the intensity, and duration of the potential effect, along with implementation of mitigation measures to determine whether an impact is significant or less than significant. Assess the characteristics and features of the RSA to determine context.

3.15.4.4 Method for Determining Significance under CEQA

For this analysis and based on the CEQA Guidelines, the project would have a significant impact if it would:

- Prevent the use of an established park, recreation, or open space
- Acquire an open space resource that would result in a diminished capacity to use that resource or a substantially reduced value of that resource
- Create a physical barrier (or a perceived barrier) to the access to or established use of any park, recreation, or open space areas
- Result in acquisition of a recreation resource that would result in a diminished capacity to use the resource for specific and defined recreational activities
  - Thresholds of significance for indirect impacts on community facilities are defined in other sections such as Transportation, Noise and Vibration, and Aesthetics and Visual Resources.
- Increase the use of existing neighborhood and regional parks or other recreation facilities such that substantial physical deterioration of the facility would occur or be accelerated
- Result in the physical alteration of the existing facilities or a need to provide new parks or other recreation facilities—the construction of which could cause significant environmental impacts—to maintain acceptable service ratios or other performance objectives

3.15.5 Affected Environment

Include a concise summary description of existing parks, recreation facilities, and open space areas along the proposed HSR alignments and at proposed HSR facilities. In particular:

- Identify all relevant public parks, recreational facilities (include schools if available for public recreation purposes), and open space uses (include trails and bikeways). A map may be created to illustrate the locations of parks, recreational facilities, and open spaces, alternatives, and proposed mitigation measures. Mapping should be of sufficient scale to illustrate the geographic relationship of the alternatives to parks, recreation, and open space areas. Ensure the map boundary does not exceed the extent of the project segment and clearly shows the location and areal extent of project impacts and landscape features. Obtain Authority, FRA, and PMT concurrence on mapping scale before preparing an administration draft EIR/EIS section.
- Document established local policies concerning the content of parks, recreation, and open space-related impacts.

- Describe pertinent stakeholder issues and concerns from public outreach efforts and contact with local agencies.
- Cross-reference all subsections of the EIR/EIS (by lowest heading tier, e.g., 3.X.X) that describe the resources or are related to the resources (e.g., Station Planning, Land Use, and Development, Communities and Environmental Justice, or Section 4(f) and 6(f) Evaluations).

Table 3.15-3 provides key information needed for a complete description of the Affected Environment.

Table 3.15-3 Key Information and Sources for Affected Environment

Key Information	Sources of Information
▪ Existing regional and local open space, parks, and recreation areas (including trails and bikeways) and recreation facilities ▪ Include schools to the extent they are available for public recreation purposes ▪ Existing national parks, state parks and wilderness areas ▪ Vehicular and pedestrian access to parks and recreation facilities, and open space ▪ Maps and tables to help describe the setting ▪ Cross-reference of all sections of the EIR/EIS that describe open space, parks, and recreation resources	▪ EIR/EIS sections—Regional Growth, Station Planning, and Land Use; Socioeconomics and Communities; Noise and Vibration; and Aesthetics and Visual Resources ▪ National Park Service, U.S. Forest Service and Bureau of Land Management data ▪ Program EIR/EIS ▪ General and regional plans ▪ Park master plans ▪ Field surveys ▪ Aerial and ground photography ▪ GIS data ▪ Outreach with the public and officials with jurisdiction ▪ Interviews with local planning organizations

3.15.6 Environmental Consequences

General formatting and terminology for constructing the discussion of environmental consequences is provided in Section 3.0.6, Environmental Consequences. The following direction is specific for the evaluation of Parks, Recreation, and Open Space. The heading structure for the Parks, Recreation, and Open Space EIR/EIS discussion is shown in Section 3.15.11.

Give each impact a short descriptive title and number, for example, *Impact PK-1, Project acquisition of school district play areas and recreation facilities would reduce the capacities of these facilities.* Explain the results of the analysis prescribed in Section 3.15.4. In particular, describe how the activity or physical change causes an impact upon the resource, reaching specific, separate conclusions about significance for each impact based on the significance criteria and methods defined in the NEPA and CEQA subsections of Section 3.15.4. For example:

> *The Urban Alternative would require the acquisition of 10 acres of an adjacent baseball park to accommodate an at-grade portion of the HSR, as well as maintenance access. The acquired portion of the park houses two baseball fields, which is the key feature and primary function of the park. The park was originally designed and constructed to accommodate the overflow use of nearby parks. The acquisition represents 50 percent of the park's capacity. The city has determined that the acquisition would reduce the capacity of the park to a point where overflow use would have to be accommodated by similar facilities in nearby locations. Under CEQA, this is considered a significant impact as it would reduce the capacity of the park to accommodate the number of recreational*

> *activities it was originally designed for and would increase the use of other parks causing a substantial and accelerated deterioration of those facilities. The impact is also significant under NEPA as the acquisition would reduce the viable portion of the resource by 50 percent.*

Simplify impact discussions whenever possible with references or citations to the more detailed information in the appendices. Use tables whenever possible to summarize the impacts and simplify the text.

3.15.7 Mitigation Measures

General formatting and terminology for constructing the discussion of mitigation measures is provided in Section 3.0.7, Mitigation Measures. The following direction is specific for the evaluation of Parks, Recreation, and Open Space. Present the mitigation measures associated with the project alternatives within each geographic segment under the subheadings of Construction Measures and Operations Measures. The heading structure for the Parks, Recreation, and Open Space EIR/EIS discussion is shown in Section 3.15.11.

Develop project-level measures that are consistent with adopted program and project strategies that avoid or minimize impacts. Begin by considering programmatic mitigation strategies described in Section 3.0.7 and the parks, recreation, and open space-related technical reports and environmental document sections in the most recent environmental documents produced by the Authority (e.g., *Fresno to Bakersfield Section Final EIR/EIS* , or more recent HSR project EIS/EIR), as applicable to the HSR project section.

Identify section-specific measures to mitigate any significant effects, such as avoiding park, recreation, or open space property or collecting additional maintenance funds. Analyze the effectiveness of identified mitigation to determine the significance of residual impacts after mitigation. The explanation of impact avoidance or attenuation must be based upon features that are substantiated by information provided in the EIR/EIS or associated appendices/volumes.

Draft the mitigation measures to facilitate transition into the Mitigation Monitoring and Enforcement Plan by identifying responsibility and timing for implementation, as appropriate. For example:

> *The Authority will provide financial compensation for purchase and development of replacement park property of at least equivalent value with the property acquired or, where appropriate, enhancement of the existing facility. Where applicable, this process will be consistent with Section 6(f) requirements and provide park enhancement as appropriate.*

3.15.8 Impacts from Implementing Mitigation Measures

General guidance for evaluating the impacts of implementing mitigation measures is provided in Section 3.0.8, Impacts from Implementing Mitigation Measures.

Consider and disclose both positive and negative impacts of mitigation measures as part of the environmental analysis. For example:

> *The relevant jurisdictions will be consulted to establish appropriate compensation in terms of allowance or additional property to accommodate for displaced park use during construction. Options may include the installation of recreational facilities, trails, and landscaping on lands currently owned by the city but not already developed, or may include temporary park development on open lands until the park can be reopened.*

Evaluate all mitigation measures, including off-site measures, using the methods in Section 3.15.4. Determine probable impacts using actual, on-the-ground analysis and describe the substantial basis for analytical conclusions (including defined thresholds or other criteria).

When the impacts of mitigation measures cannot be quantified (e.g., at a specific location, in a definite extent, at a particular time or duration, or measurable alteration of the affected resource), evaluate potential impacts using clearly described assumptions based upon reasonably foreseeable outcomes.

3.15.9 Impacts Summary

3.15.9.1 NEPA Impacts

The overall structure and content of this discussion is presented in Section 3.0.9.1, NEPA Impacts. The heading structure for this organizational scheme is shown in Section 3.15.11. Use maps, as appropriate, to show locations of significant impacts of alternatives by segment.

3.15.9.2 CEQA Significance Conclusions

The overall structure and content of this discussion is presented in Section 3.0.9.2, CEQA Significance Conclusions. The heading structure for this organizational scheme is shown in Section 3.15.11. Use maps, as appropriate, to show locations of significant unavoidable impacts of alternatives by segment.

3.15.10 Products

The RC is responsible for preparing the following products, under Authority and FRA direction, according to PMT guidance and subject to PMT quality control and assurance.

3.15.10.1 Technical Report or Appendix

In addition to the Volume 1 impacts analysis chapter, provide technical reports and Volume 2 appendices where full analysis applicable to the HSR project section requires details in excess of efficient inclusion in the EIR/EIS Volume 1 chapter. For example:

1. Volume 2, Appendix 3.1-B, Regional and Local Policy Inventory
2. Volume 2, Appendix 3.15-A, Parks, Recreation, and Open Space-related Appendices in recent EIR/EIS
3. Parks, Recreation, and Open Space Technical Report

3.15.10.2 Project EIR/EIS Volume 1

1. Summary/Table For EIR/EIS Executive Summary
2. Project Description—Parks, Recreation, and Open Space-Related Components
    a. Impact Avoidance and Minimization Features
    b. Summary Table of Impact Avoidance and Minimization Features, and Project Impacts
3. Affected Environment, Environmental Consequences and Mitigation Measures Section: Parks, Recreation, and Open Space
4. Affected Environment, Environmental Consequences and Mitigation Measures Section: Cumulative Impacts

3.15.11 Parks, Recreation, and Open Space EIR/EIS Outline

The RC will use the following outline for organizing content related to the resource in Chapter 3 of the project EIR/EIS, using the heading hierarchy and format as indicated. The RC will consider the impacts of implementing mitigation measures in Section 3.15.7.

3.15 Parks, Recreation, and Open Space
- 3.15.1 Introduction
- 3.15.2 Laws, Regulations and Orders
  - 3.15.2.1 Federal
  - 3.15.2.2 State
  - 3.15.2.3 Regional and Local
- 3.15.3 Regional and Local Policy Analysis
- 3.15.4 Methods for Evaluating Impacts
  - 3.15.4.1 Definition of Resource Study Area
  - 3.15.4.2 Method for Determining Significance under NEPA
  - 3.15.4.3 Method for Determining Significance under CEQA
- 3.15.5 Affected Environment
  - 3.15.5.1 Project Segment 1
    - Alternative 1
    - Alternative 2
    - Alternative 3
    - Alternative N
  - 3.15.5.2 Project Segment 2
    - Alternative 1
    - Alternative 2
    - Alternative 3
    - Alternative N
  - 3.15.5.3 Project Segment 3
    - Alternative 1
    - Alternative 2
    - Alternative 3
    - Alternative N
  - 3.15.5.4 Project Segment N
    - Alternative 1
    - Alternative 2
    - Alternative 3
    - Alternative N
- 3.15.6 Environmental Consequences
  - 3.15.6.1 Overview
  - 3.15.6.2 Project Segment 1
    - No Project
    - Alternative 1
      - Construction Impacts
      - Operations Impacts
    - Alternative 2
      - Construction Impacts
      - Operations Impacts
    - Alternative 3
      - Construction Impacts
      - Operations Impacts
    - Alternative N
      - Construction Impacts
      - Operations Impacts

- 3.15.6.3 Project Segment 2
  - No Project
  - Alternative 1
    - Construction Impacts
    - Operations Impacts
  - Alternative 2
    - Construction Impacts
    - Operations Impacts
  - Alternative 3
    - Construction Impacts
    - Operations Impacts
  - Alternative N
    - Construction Impacts
    - Operations Impacts
- 3.15.6.4 Project Segment 3
  - No Project
  - Alternative 1
    - Construction Impacts
    - Operations Impacts
  - Alternative 2
    - Construction Impacts
    - Operations Impacts
  - Alternative 3
    - Construction Impacts
    - Operations Impacts
  - Alternative N
    - Construction Impacts
    - Operations Impacts
- 3.15.6.5 Project Segment N
  - No Project
  - Alternative 1
    - Construction Impacts
    - Operations Impacts
  - Alternative 2
    - Construction Impacts
    - Operations Impacts
  - Alternative 3
    - Construction Impacts
    - Operations Impacts
  - Alternative N
    - Construction Impacts
    - Operations Impacts

3.15.7 Mitigation Measures

- 3.15.7.1 Project Segment 1
  - Alternative 1
    - Construction Measures
    - Operations Measures
  - Alternative 2
    - Construction Measures
    - Operations Measures
  - Alternative 3
    - Construction Measures
    - Operations Measures

3.16 Aesthetics and Visual Quality

The methodology guidelines in this section are organized by a sequence of steps for preparing an environmental document. Section 3.16.12 provides an outline for the environmental impact report/environmental impact statement (EIR/EIS) section.

Section 3.0, General Methodology Guidance for Resource Sections, provides the methodological framework common to the evaluation of all resource areas. Section 3.19, Cumulative Impacts, provides the cumulative impact analysis methodology. Use Section 3.0 and Section 3.19 in combination with this Aesthetics and Visual Quality guidance section when developing the EIR/EIS analyses.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the resource section. Example text that illustrates the concepts and methods is shown in *italics*. The methods are organized to mirror the organization of the EIR/EIS section or chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

If there is a discrepancy between the material in this guidance and any adopted federal or state agency guideline or manual applicable to aesthetics and visual quality, the agency guideline and manual controls. Identify and discuss any such discrepancy with the California High-Speed Rail Authority (Authority), Federal Railroad Administration (FRA), and the Program Management Team (PMT) before deviating from this guidance.

3.16.1 Introduction

The general method for preparing an introduction for this resource section is provided in Section 3.0.1, Introduction. The following discussion presents direction specific to Aesthetics and Visual Quality.

Refer specifically to related content in other sections of the EIR/EIS that influence or are influenced by the Aesthetics and Visual Quality impact analysis (e.g., noise, community, biology, cultural resources, Section 4(f) and 6(f), cumulative) and supportive/associated technical documents. References to other documents must include citation to specific sections (by lowest heading tier, e.g., 3.X.X), not just a general reference to a chapter in the EIR/EIS.

3.16.2 Laws, Regulations, and Orders

Federal, state, and local laws, regulations, orders or plans germane to aesthetics and visual quality in the geographic area that is affected by the project are presented below. General National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) requirements for assessment and disclosure of environmental impacts are described in Section 3.1, Introduction, and are therefore not restated in the resource section of the chapter.

3.16.2.1 Federal

U.S. Department of Transportation Act (Section 4(f)) (49 U.S.C. § 303) (as applicable to a given section)

Compliance with Section 4(f) is required for transportation projects undertaken by an operating administration of the U.S. Department of Transportation or that may receive federal funding and/or discretionary approvals. Section 4(f) protects the natural beauty of publicly owned land of parks, recreational areas, wildlife refuges, as well as historic sites of national, state, or local significance located on public or private land. The FRA may not approve the use of a Section 4(f) property, as defined in 49 U.S.C. § 303(c), unless it determines that there is no feasible and prudent alternative to avoid the use of the property and the action includes all possible planning

to minimize harm resulting from such use, or the project has a *de minimis* impact on the 4(f) property consistent with the requirements of 49 U.S.C. § 303(d).

Federal Railroad Administration (64 Fed. Reg. 28545)

The FRA *Procedures for Considering Environmental Impacts* states that "the EIS should identify any significant changes likely to occur in the natural environment and in the developed environment. The EIS should also discuss the consideration given to design quality, art, and architecture in project planning and development as required by U.S. Department of Transportation Order 5610.4."

National Historic Preservation Act (16 U.S.C. § 470 et seq.) (as applicable to a given section)

The National Historic Preservation Act (NHPA) establishes the federal government policy on historic preservation. Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties. Potential adverse effects include change in the physical features of the property's setting that contribute to its historic significance, or introduction of visual elements that diminish the integrity of the property's significant historic features.

Federal Land Policy and Management Act—(43 U.S.C. 1701, et seq., 102(a), 103(c), 201(a), 505(a)) (as applicable to a given section)

The Federal Land Policy and Management Act (FLPMA) requires that public lands be managed to protect and minimize damage to scenic and aesthetic values. Under the FLPMA, the Bureau of Land Management uses a Visual Resource Management System (113 Stat. 224, Public Law 106-45-A, August 10, 1999) to manage resources under its jurisdiction. As applicable to sections within or affecting areas managed by the Bureau of Land Management, the evaluation of aesthetic and visual quality shall consider the rules or guidance under the Visual Resource Management System for the purpose of applying area specific management priorities.

3.16.2.2 State

State Scenic Highways (Streets and Highways Code §§ 260 to 263) (as applicable to a given section)

The State Scenic Highways Program lists highways that are either eligible for designation as a scenic highway or already are designated as a scenic highway. A highway may be designated as scenic on the basis of the amount of natural landscape that can be seen by travelers, the scenic quality of the landscape, and the extent to which development intrudes upon the traveler's enjoyment of the view (Caltrans 2010). The Streets and Highways Code establishes state responsibility for protecting, preserving, and enhancing California's natural scenic beauty of scenic routes and areas that require special scenic conservation and treatment.

3.16.2.3 Regional and Local

Compile a complete inventory of adopted local and regional plans, ordinances, or guidelines related to aesthetics and visual quality. Use a tabular format similar to that used in the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014), or a more recent HSR project EIR/EIS may be used, to organize and concisely report this information. This information will become part of Volume 2 Appendix 3.1-B Regional and Local Policy Inventory.

County or Municipal General Plans or Community Plans

- Land use, community character, cultural resources, historic preservation, open space, parks and recreation
- Goals, objectives, policies or implementation measures

- Specific plans or redevelopment plans (as applicable/enforceable) (as applicable to areas where legislation requires state agencies to comply with local regulations or as a matter of comity where compliance is feasible and sensible for the project)
- Local and regional policies related to possible aesthetic and visual resource effects, such as downtown master plans, community plans, and specific plans
- Adopted policies, plans, programs, supporting preservation of local aesthetic and visual resources, such as design guidelines, designated scenic corridors/routes, areas of particular scenic value, landmarks, gateways, historic districts

County or Municipal Jurisdiction Ordinances and Codes

- Zoning or other land development ordinances
- Heritage or tree preservation ordinances
- Development or design standards or guidelines

Scenic Byways Management Plans (as applicable to sections within or affecting Scenic Byways)

- Adopted regulations related to aesthetic, scenic, community values associated with designated scenic byways

Local Coastal Program Regulations (as applicable to sections within or affecting coastal zones)

- Adopted regulations related to preservation of public views

3.16.3 Regional and Local Policy Analysis

The overall structure of this discussion is presented in Section 3.0.3, Regional and Local Policy Analysis. As described in more detail in subsection 3.0.3.2, this analysis will describe any inconsistencies or conflicts with adopted regional or local policies and implementation of the HSR project.

3.16.4 Methods for Evaluating Impacts

Evaluation of impacts on aesthetics and visual quality is a requirement of CEQA, as well as NEPA. The methodology used to evaluate aesthetics and visual quality impacts is generally based on the visual impact assessment methodology described in the Federal Highway Administration (FHWA) *Guidelines for the Visual Impact Assessment of Highway Projects* (FHWA HEP-15-029) (FHWA VIA Guidelines https://www.environment.fhwa.dot.gov/guidebook/documents/VIA_Guidelines_for_Highway_Projects.asp). The visual impact assessment methodology is carried out in four phases: Establishment, Inventory, Analysis and Mitigation. In the Establishment Phase, describe the methodology for developing the resource study area (RSA), identifying landscape units within the RSA, and for evaluating effects under CEQA and NEPA. In addition, describe the visual character of the proposed project and prior and on-going efforts to avoid impacts on aesthetic and visual resources, including reference to impact avoidance and minimization features described in Section 2.5.2, HSR Build Alternatives. In the Inventory Phase, list and describe visual resources within the the natural, cultural[1], and project environments in the corridor based on resources identified in applicable planning documents, observed during field surveys, or defined by local sources. Also describe the affected population (types of viewers) in the RSA. In the Analysis Phase, evaluate impacts on visual quality based on the compatibility of the resource change and viewer sensitivity, and in the Mitigation Phase define the project specific mitigation and

[1] As defined by FHWA in their *Guidelines for the Visual Impact Assessment of Highway Projects (FHWA-HEP-15-029)*, cultural visual resources are resources that were constructed by people, including buildings, structures and artifacts.

enhancement efforts to be included in the project design. Subsequent sections in this methodology provide direction for the design of mitigation measures and the structure for presenting content related to aesthetics and visual quality in the EIR/EIS documents.

3.16.4.1 Definition of Resource Study Area

The RSA is the area in which all environmental investigations specific to aesthetics and visual quality are conducted to determine the resource characteristics and potential impacts of the Project Segment. The RSA for aesthetics and visual quality is the same as the area of visual effect (AVE), as defined in FHWA's VIA Guidelines. The factors making up the RSA and the description of the elements comprising the RSA (including an illustrative figure) are provided in Section 3.0.4.1, Definition of Resource Study Area, and Section 3.0.4.2, Methodology for Impact Analysis.

The boundaries of the RSA for aesthetics and visual quality extend beyond the project footprint generally encompassing the viewshed(s), or area of project visibility, as further discussed in Section 3.16.5. Focus on the visual effects of HSR improvements and operations in relation to existing visual quality and character, scenic resources, and types of viewers. For direct impacts on aesthetics and visual quality the RSA is at least the project footprint, as described in Chapter 2, Alternatives, plus 0.25 mile (urban environments) or 0.50 mile (rural environments) from the project footprint depending on the visibility of the project components taking into account the area's landform (topography), land cover (vegetation and structures), and atmospheric conditions (dust, fog, precipitation).

For defining the RSA key views and distance zones will determine the extent to which the project is visible. For the aesthetic and visual quality analysis, the 0.25- or 0.50-mile distance zone from the project footprint is considered the area within the foreground (area of highest visual concern) from the project. The distance zone from the foreground up to 3.0 miles is considered the area within the middleground (area of moderate visual concern) from the project. When collecting an inventory of visual resources, the Regional Consultant (RC) should consider resources that extend beyond the foreground and middleground from the project, such as mountain ridgelines, large iconic structures, water features, etc., as these resources may be visible from a great distance. When considering the visibility of project features, the RC should consider 3.0 miles (the end of the middleground and start of the background distance zone) as the maximum viewing distance in which project changes would be perceptible. A viewing distance of 3.0 miles is considered the farthest boundary in which probable project impacts are likely to generate public concern since the project would have limited visual presence at that distance.

Expand or reconfigure the RSA as warranted by resource conditions and the potential extent of effects of the HSR improvements and operations within or beyond the HSR section limits. The RSA may be refined, in consultation with the PMT and local jurisdiction, to reflect local conditions and to consider more distant effects, where necessary, such as where elevated structures affect horizons.

Within the RSA identify landscape units. Landscape units are the geographic unit on which impacts on visual character, viewers and visual quality are assessed. Landscape units are defined by viewsheds, landscape and land use type; including the existing visual character and types of viewers.

The RSA for cumulative impacts will be larger than the project related RSAs to encompass the area within which project impacts accumulate or interact with the impacts of other actions, including adjacent HSR project sections. See Section 3.19, Methodology for Cumulative Impacts, for a more detailed discussion.

Physical and operational elements of the RSA are described in Table 3.16-1**Error! Reference source not found.**. The project footprint and RSA extents in Table 3.16-1 are the minimum areas for investigation.

Table 3.16-1 Resource Study Area Information

Required Information	Resource Study Area
▪ Aerial maps ▪ Geographic information system (GIS) base (including Google Earth KMZ files from the GIS data) ▪ Project description—HSR system, linear and sited facilities, stations, operations, ancillary improvements ▪ Project plans and profiles, other design materials in sufficient detail to complete environmental impact assessment of all proposed improvements and operations within the affected geographic area ("project footprint") – Design elements include the HSR project and related facilities (including retaining walls, safety barriers, and fencing), temporary access and construction/staging areas, utility improvements and connections, proposed landscaping and lighting plans, ▪ Station locations and footprints in sufficient detail to complete environmental impact assessment of all construction and operations, regardless of implementation or operating entity ▪ Renderings or visual simulations at locations of particular concern due to sensitive viewer groups and visual context that would be substantially altered by the HSR infrastructure ▪ Construction phases and interim build conditions/ transitions for all project and ancillary improve-ments, and stations ▪ Right-of-way data showing parcel acquisitions ▪ Local and regional land use plans and other relevant land use documents ▪ Local and regional zoning ordinances and codes ▪ Regional planning documents, Coastal Zone Management Plan, etc. ▪ Community Impact Assessment Report ▪ Public scoping comments ▪ Noise Study Report, including sound walls ▪ Historic Property Survey Report ▪ Section 4(f) and 6(f) Evaluation Report	▪ Identify project viewshed(s) (the area that could potentially have views of project features, and the area potentially viewed from the project) using GIS and/or other appropriate tools. ▪ Map the RSA using viewshed(s) within up to 3 miles of any project feature, representing areas which are considered foreground views and middleground views, and considering scenic vistas. For large visible changes such as tunnel portals or large cuts/fills and large components, such as aerial structures that could be seen from a long distance, consider expanding viewshed(s) as appropriate. ▪ Identify limiting factors, such as distance, climate, air quality, topography, vegetation, existing development, etc., that may block or partially obscure views. ▪ In agricultural and other open areas, the corridor could be visible over extensive areas due to the general scarcity of buildings and tall vegetation that could block views. In these areas, the foreground of the RSA is considered to be all areas within 0.50 mile of the alignment centerline as this would represent the area of highest visual concern. ▪ In urbanized areas, project visibility is often more restricted by the presence of buildings and tall vegetation. Therefore, the foreground of the RSA in urbanized areas would generally be considered to be within 0.25 mile of the alignment centerline. However, be sure to consider the occurrence of "view corridors" such as along major arterials, channels or rivers, freeways, railways or other transportation corridors.

3.16.5 Methodology for Impact Analysis

Group and consolidate information and discussion in the EIR/EIS by landscape unit to effectively present content to the lay audience. Present detailed information on visual quality or character changes as a result of the proposed HSR alternatives in the EIR/EIS Volume 2 appendix associated with this resource, with specific reference to the appendix provided in the Chapter 3 topical section to help the reader navigate between volumes. Information contained in the appendix may include renderings and visual simulations (before and after pictures) of HSR infrastructure with corresponding view character and quality assessment, viewshed analysis

process and outcome, descriptions of the types of viewers and their preferences, maps and tables depicting the RSA, landscape units, key viewpoint locations, and key resources (including scenic roadways or scenic vistas) with corresponding descriptions, or other information that may be considered necessary for documenting the summary outcomes described in this section.

Begin analysis of impacts with consideration of impact avoidance and minimization features that are incorporated into the project in Section 2.5.2, HSR Build Alternatives, and evaluated in Volume 2, Appendix 2-E. Account for implementation of design features or best management practices, for example those set forth in the Authority's *Urban Design Guidelines for the California High Speed Train Project* (March 2011). Refer to the summary table of impact avoidance and minimization features, and explain how particular features avoid impacts or ensure less-than-significant impacts to aesthetics and visual quality.

Analyze direct and indirect impacts related to aesthetics and visual quality through qualitative analysis and, where possible, with quantitative analysis. Analyze impacts that may occur during construction and operation of the HSR system (*note*: the analytical results for Construction Impacts and Operations Impacts are presented separately in the EIR/EIS). Table 3.16-2 identifies types of construction and operation impacts.

Provide detailed mapping of a sufficient scale to illustrate the RSA and landscape units and the geographic relationship of the alternatives to elements of the natural, cultural and project environments. Ensure the map boundary does not exceed the extent of the project segment and clearly shows the location and aerial extent of project impacts and major landscape features and landmarks. Obtain Authority, FRA, and PMT concurrence on mapping scale before preparing an administrative draft EIR/EIS section.

Table 3.16-2 Source and Description of Aesthetic and Visual Quality Impacts

Source of Impacts	Description of Impacts
Construction activities with potential for temporary impacts to aesthetics and visual quality	▪ Light and glare spill-over into adjacent sensitive land uses, including safety lighting ▪ Potential for construction area dust to result in substantial impacts related to visibility (airborne dust) ▪ Clearing, grubbing, and grading ▪ Excavations and falsework (concrete forms, panels, scaffolding) ▪ Visibility of large equipment ▪ Brightly colored, informational, or cautionary signs, barriers, and clothing – Note that visual impacts associated with brightly colored or visually apparent construction-related elements, such as informational signs, barriers, construction clothing, structures or equipment, have an intended safety benefit. ▪ Soil stockpiling and material storage ▪ Temporary structures or operation centers (trailers, fencing, parking, etc.) ▪ Temporary routes and route signage ▪ Trash, debris, dust, weeds, and graffiti

Table 3.16-2 Source and Description of Aesthetic and Visual Quality Impacts (continued)

Source of Impacts	Description of Impacts
Construction impacts resulting from permanent, physical changes of the landscape by project facilities, such as columns and elevated guideway structures, HSR power delivery and other infrastructure, maintenance facilities, stations and parking lots/structures	▪ Compatibility of the location, scale, form and materials for the: o Stations and support facilities (switching and paralleling stations, traction power substations, maintenance facilities, signal towers, gantries, overhead contact systems, etc.) o Trains, tracks, signs, and signals o Parking structures and lots o Service roads o Aerial structures and columns o Barriers, retaining, and sound walls ▪ Light and glare spillover or changes in intensity ▪ Removal or addition of vegetation ▪ Introduction of an incompatible visual element resulting in a substantial adverse impact ▪ Removal of important features, such as buildings, land forms, vegetation, or other scenic resources ▪ Block, screen, obstruct, or otherwise interfere with views of scenic resources and important visual landmarks, including properties on or eligible for the National Register of Historic Places, properties that contribute to a historic district or cited in local historic registers, general plans, or other policy documents, or properties specifically designed to take advantage of existing views ▪ Substantially screen or block views of commercial land uses (or their signage) from the adjacent roadways, when that land use is dependent upon their visibility for customers ▪ Introduce or open new views either by eliminating objects that currently obscure or block views, elevating features that are currently at-grade or constructing new features that have aesthetic quality
Operational impacts resulting from ongoing activities of the HSR system, such as passenger access to/from stations and use of parking structures/lots, maintenance activities along the HSR alignment and at specialized facilities, guideway and facility security patrols	▪ Access to/from and activities associated with stations and support facilities (switching and paralleling stations, traction power substations, maintenance facilities, signal towers, gantries, overhead contact systems, etc.) ▪ Light and sound generated by HSR trains, tracks, signs, and signals ▪ Light and glare spillover, or changes in intensity, from HSR guideway and infrastructure along alignment, stations and maintenance facilities, parking structures and lots ▪ Light and sound generated by HSR maintenance and security travel along the guideway and sited facilities ▪ Block, screen, obstruct, or otherwise interfere with views of scenic resources and important visual landmarks, including properties on or eligible for the National Register of Historic Places, properties that contribute to a historic district or cited in local historic registers, general plans, or other policy documents, or properties specifically designed to take advantage of existing views

Clarify the important distinction between changes in visual character or quality that are incompatible with existing views and visual changes that, while different than the existing aesthetic character, are compatible with surrounding uses and resources and are consistent with adopted plans and policies. Examples are the introduction of an elevated rail system adjacent to an elevated highway system, removal of ornamental vegetation that opens views to distant skylines, and placement of large infrastructure in an urban environment that complements existing architecture and is compatible with land use plans and ordinances.

Base the analysis on a review of available reports and data (including federal and state statutes, resource agency, local, and regional agency policies and ordinances), discussions with agency representatives in the region, field investigation, photographs, modeling (where applicable), public input (such as scoping comments), and professional judgment. Review the data and impact analyses in the other sections prepared for the EIR/EIS, including Noise and Vibration, Safety and Security, Station Planning, Land Use and Development, Parks, Recreation and Open Space, and Cultural Resources. Develop aesthetics and visual quality GIS databases for each project segment. Develop all GIS data (1) as part of project design or (2) from available federal, state and local sources. Provide sufficient detail to allow complete analysis of the anticipated design of the completed project or of reasonable assumptions for project implementation, including structures for grade-separated alignment crossings and water crossings, maintenance road access, sound and retaining wall placement, property acquisitions, etc. Focus the analysis on the project's potential compatibility with the existing natural, cultural and project environments of the landscape unit(s) and the RSA. Consider potential for Section 106 findings of adverse effects.

The methodology used to evaluate aesthetics and visual quality impacts is generally based on the visual impact assessment methodology described in the FHWA VIA Guidelines. The FHWA visual impact assessment methodology is the accepted methodology used by federal agencies for analyzing both visual quality impacts and viewer response for projects within transportation corridors.

The FHWA visual impact assessment methodology is carried out in four phases: Establishment, Inventory, Analysis and Mitigation. Using this methodology the RC will: *establish* the project's regulatory context, the RSA and landscape unit(s) based on the project's visibility, and the visual character of the proposed project; *inventory* the existing visual character of the RSA, the affected population, and what people like or dislike seeing; *analyze* and objectively evaluate whether the project has a beneficial, adverse or neutral impact on the existing visual character or quality of a landscape unit or a scenic vista and on viewer response, and describe project *mitigation*. The process for this methodology, as presented in the FHWA guidelines, is shown in Figure 3.16-1:

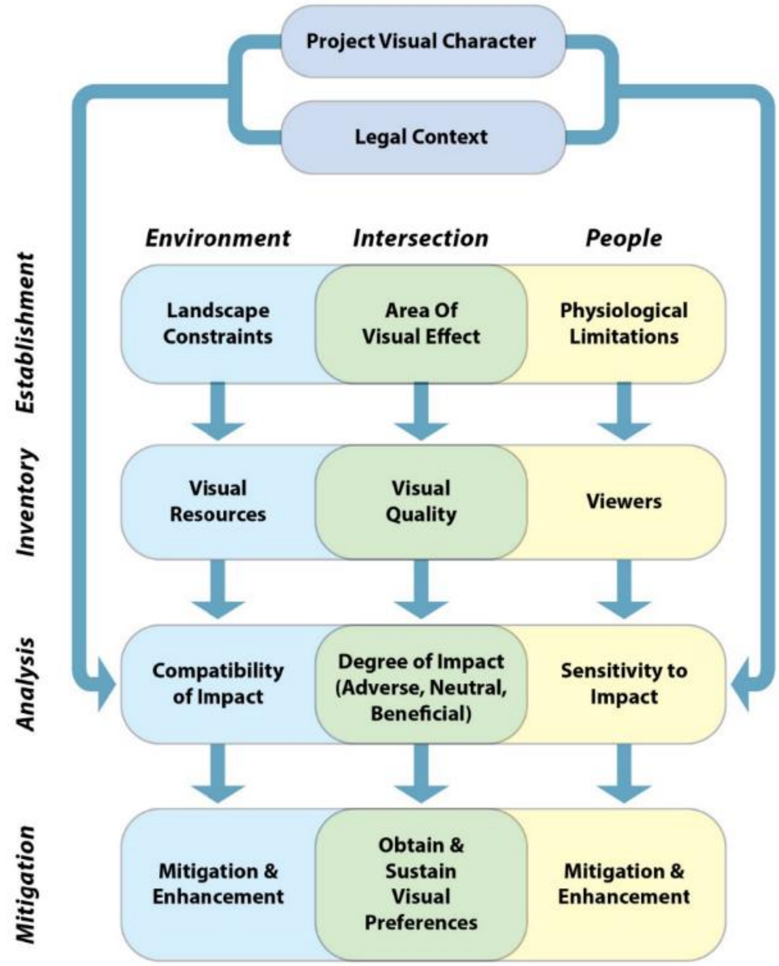


Figure 3.16-1 FHWA Visual Impact Assessment Process

The aesthetics and visual quality analysis will include the following elements:

- Project's visual character (scale, form, materials)
- Regulatory context
- Project setting (the visual character of the RSA's and landscape units' natural environment, cultural environment, and project environment)
- Key viewpoints (KVP)
- Affected population (types of viewers and their visual preferences)
- Compatibility of the impact/change
- Sensitivity to the impact/change (viewer awareness and exposure)
- Degree of the impact (beneficial, adverse, or neutral)
- Mitigation to address direct and indirect impacts

The following are terms and concepts that are used when evaluating visual impacts:

- **Viewshed** is an area within which project features would be visible. The viewshed includes an area that could potentially have views of project features and an area potentially viewed from the project. The extent of a viewshed has physical limitations (by distance zones and natural and human-built features) and atmospheric limitations. Generally, a distance of 3.0

miles is considered the outer boundary of project visibility, because at that distance project features and visual changes would be barely perceptible and therefore of low visual concern. The 3.0-mile boundary would encompass the foreground (0 to 0.25 or 0.5 miles from project features) and middleground (from the foreground up to 3 miles from project features) viewing distances (i.e., the areas of high to moderate visibility). Within urban environments the project viewshed is constrained by development, which effectively limits visibility of project features. Within these areas the project viewshed, and the foreground of the view, is considered to extend to a distance of 0.25 mile from project features. Within the urban environment some consideration should be given to corridor views such as along major arterials, waterways, highways, etc. that may open views to more distant vistas. In agricultural and other open areas, the project viewshed, and the foreground of the view, extends to 0.50 mile from project features due to the lack of buildings and tall vegetation that could block views. The 0.25- and 0.50-mile viewing distance is consistent with the parameters used in the *Fresno to Bakersfield Section Final EIR/EIS*.

- **Visual Resource** is a component of the natural, cultural or project environments that are capable of being seen.
  - Natural Visual Resources: The land, water, vegetation, and animals that compose the natural environment.
  - Cultural Visual Resources: The buildings, structures and artifacts that compose the cultural environment.
  - Project Visual Resources: The geometrics, structures and fixtures that compose the project environment.

  For this discussion, visual resources also include state designated scenic routes and views towards and within natural areas, parks, and urban areas identified as having historical or cultural significance or that include buildings of similar significance or notable landmark status. Policy documents, cultural resource reports, or observations of scenic value and apparent local popularity identified during fieldwork may direct the list of visual resources.

- **Landscape Units** are defined areas within the RSA that have similar visual features and homogeneous visual character and are often comprised of a single viewshed. Landscape units are the geographic unit on which impacts on visual character, viewers and visual quality are assessed. Examples of types of landscape units may include irrigated row crop agriculture, industrial, automobile-oriented retail shopping centers, single-family residential, undeveloped vacant lots, downtown business districts, and parks. Landscape units consist of a grouping of related KVPs.
- **Visual Character** is an impartial description of the visible attributes of a scene or object such as form (dominance and scale), line, color and texture. Visual character-defining resources and features include elements of the natural, cultural and project environments.
- **Visual Quality** is an assessment of what viewers like and dislike about visual resources that compose the visual character of a particular scene. Different viewers may evaluate specific visual resources differently based on their interests. Elements of visual quality include:
  - Natural Harmony: What a viewer likes and dislikes about the natural environment. The viewer labels the visual resources of the natural environment as being either harmonious or inharmonious.
  - Cultural Order: What a viewer likes and dislikes about the cultural environment. The viewer labels the visual resources of the cultural environment as being either harmonious or inharmonious.

  - Project Coherence: What the viewer likes and dislikes about the project environment. The viewer labels the visual resources of the project environment as being either coherent or incoherent.

- **Key Viewpoints** are used to provide representative examples of existing views of the landscape as seen by viewers within each landscape unit. KVPs are also used to illustrate whether the project would be compatible or incompatible with those views. KVPs represent specific locations within a landscape unit from which a proposed project would be visible to viewers. KVPs are very useful for depicting the range of visual character and visual quality found within a landscape unit. These locations are typically selected to either represent (1) typical views from common types of viewing areas, such as certain highways or residential areas with exposure to the project or (2) specific high-sensitivity areas such as parks, scenic viewpoints, and historic districts that may be impacted by a proposed project. The impact determination for an individual KVP may not be the same as the impact determination for the entire landscape unit in which the KVP is located. This is because when determining impacts on landscape units, the entire landscape unit is considered, not just one specific location. The RC will consult with the PMT and obtain Authority and FRA concurrence on the number and location of the defined set of representative KVPs before beginning analysis. The condition of the viewed landscape seen from a sensitive or unique KVP may be different than that of the entire landscape unit.

- **Viewers** are neighbors who can see the proposed project and travelers who would use it. The following are types of neighbors and travelers:

  - Neighbors: Residential, recreational, institutional, civic, retail, commercial, industrial and agricultural.

  - Travelers: For the HSR rail the types of travelers are commuting and touring.

  For each type of neighbor and traveler FHWA's guidelines identifies the members in each type and the standard visual preferences of that particular type.

- **Viewer Sensitivity** is an assessment of the concern viewer groups may have to changes in the visual character of visual resources based on two factors: (1) viewer awareness to visual changes (measure of attention, focus and protection) and (2) viewer exposure to visual changes (proximity, duration, number of people affected). The FHWA method recognizes viewer activity and awareness, values, and cultural significance as key factors in predicting viewer sensitivity. Project effects that are not visible or that are highly screened will not be as noticeable as project effects within the visual foreground (0 to 0.25 or 0.5 mile). For example, although retail neighbors and commuting travelers are generally moderately sensitive viewers, viewer sensitivity in established downtown areas can be high. In these areas—particularly in parks or along pedestrian-oriented sidewalks—viewers are likely to have expectations/preferences of a built environment with a higher level of cultural order associated with an identifiable urban core. Workers in the workplace are generally considered to have moderate or low sensitivity because visual quality is not typically a focus or expectation associated with their activity; however, their exposure to the view is high. Local values as reflected in public policies related to community design and cultural significance, as reflected in the designated historic status of a site, are also potential indicators of high viewer sensitivity.

- **Degree/Value of Impact** is defined as either beneficial, adverse or a neutral change to visual quality. A proposed project may benefit visual quality by either enhancing visual resources or by creating better views of those resources and improving the viewer's experience. Similarly, it may adversely affect visual quality by degrading visual resources or obstructing or altering desired views.

3.16.5.1 Method for Determining Significance under NEPA

For all impacts, determine the significance of impacts under NEPA and CEQA based on the application of the following methods.

NEPA does not provide a definitive threshold to determine significant or potentially significant impacts to aesthetics and visual quality as described in more detail in Section 3.0.4.3, Method for Determining Significance under NEPA.

Use professional judgment when considering the context and intensity of an effect to determine the significance of impacts, and the implementation of mitigation measures. Consider all relevant aspects of context (e.g., existing resource conditions, resource sensitivity) and appropriate factors of intensity (e.g., extent of change, duration of change) for determining impact significance. Also consider project actions that improve or otherwise benefit resource values in the evaluation of impact significance. For example, some aspects of a project, such as undergrounding utilities, removing vegetation or altering landforms, which result in opening new views, could have a beneficial effect and contribute to improved visual quality and aesthetic interest. Likewise, structural treatments or specialty lighting could have a beneficial effect by enhancing a project's overall aesthetic.

Guidance from federal agencies specifies the following factors to consider when determining the significance of an impact to aesthetics and visual resources:

- Introduction of elements that would conflict with the visual character of an historic district, state, or federally or state-listed or eligible historic property
- Substantial effects to a park, recreational destination, or other feature or area identified as an important visual resource
- Introduction or alteration of features that substantially contrasts with the inherent or established character of a view or landscape
- Blocking, removing, or changing a regionally or locally important visual resource or view that results in a dramatic change in the visual character or quality of the resource or view
- Consideration of viewer response where a negative response would increase the perceived impact of a visual change

3.16.5.2 Method for Determining Significance under CEQA

Based on the CEQA guidelines, the project would have a significant impact if it would:

- Have a substantial adverse effect on a scenic vista
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a designated state scenic highway corridor
- Substantially degrade the existing visual character or quality of the site and its surroundings
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area

A significant impact would also occur if the project were to (1) introduce elements that would conflict with the visual character of an historic district, federally or state-listed or eligible historic property or (2) substantially affect a park, recreational destination, or other feature or area identified as an important visual resource.

3.16.6 Affected Environment

Include a concise summary description of existing aesthetic and visual resources within the RSA and landscape unit(s) along the proposed HSR alignments and at proposed HSR facilities. In particular:

- Identify all relevant aesthetic and visual resources within the natural, cultural and project environments. A map may be created to illustrate the locations of historic districts, parks, unique topography or landforms, alternatives, and proposed mitigation measures.
- Document the regulatory context, such as established local policies concerning the context of aesthetic and visual quality-related impacts.
- Describe the affected population, including pertinent stakeholder issues and concerns from public outreach efforts and personal contact with local agencies.
- Cross-reference all sections of the EIR/EIS (by lowest heading tier, e.g., 3.X.X) that describe aesthetic and visual resources or are related to these resources (e.g., Station Planning; Land Use and Development; Parks, Recreation, and Open Space; Transportation).
- Reference specific KVPs when relevant.

Table 3.16-3 provides key information needed for a complete description of the Affected Environment and typical sources for the information.

Table 3.16-3 Key Information and Sources for Affected Environment

Key Information	Sources of Information
▪ Applicable policy and plans (including coastal zone management plans and programs) ▪ Regional and local land uses ▪ Historic development ▪ Scenic resources* ▪ Historic districts and resources* ▪ Section 4(f) and 6(f) resources ▪ Key viewpoints ▪ Scenic vistas* ▪ View corridors* ▪ Topography and landforms*	▪ General and regional plans ▪ Field surveys ▪ Aerial and ground photography ▪ Topographic maps ▪ List of designated scenic highways in Streets and Highways Code 263 et seq. ▪ GIS area of visibility from KVP ▪ Planning and development agencies ▪ Chambers of Commerce ▪ California Coastal Commission (as applicable to the section) ▪ NAVTEQ Parcel Boundaries ▪ Local organizations or groups (e.g., historic or heritage societies) ▪ Outreach activities

*Generally, these resources may be identified as officially designated (federal, state, or local) scenic resources; however, neither NEPA nor CEQA limit the consideration of visual resources to officially designated resources. Local values and goals should also be considered in developing the visual resource base. The HSR RC shall consider information obtained through public participation, local publications, planning documents, community organizations (art councils, historic societies), etc., in compiling information on special resources and considering the visual significance of landscape components.

3.16.7 Environmental Consequences

General formatting and terminology for constructing the discussion of environmental consequences is provided in Section 3.0.6, Environmental Consequences. The following direction is specific for the evaluation of Aesthetics and Visual Quality. The heading structure for the Aesthetics and Visual Quality EIR/EIS discussion is shown in Section 3.16.12.

Give each impact a short descriptive title and number e.g., *AVQ Impact #1. The permanent construction of a large HSR structure would introduce a new visual element into the existing cultural environment.* Explain the results of the analysis prescribed in Section 3.16.4. In particular, describe how the activity or physical change is compatible or incompatible with the existing natural, cultural or project environments and causes an adverse impact on visual quality (e.g., blocking views, elements out of scale or character with surrounding setting, large reflective surfaces), a beneficial impact on visual quality or a neutral change. For example:

> *Vegetation removal associated with site grubbing and grading would result in increased light and glare affecting adjacent residential neighbors, which would be perceived by these residential neighbors as the project's incoherence with the existing natural harmony of the landscape unit. This change to natural harmony would be perceived by adjacent residential neighbors, who would be sensitive to this change, as incompatible with the existing visual character. This would be a minor adverse impact on visual quality.*

Simplify impact discussions whenever possible with references or citations to the more detailed information in the appendices. Use tables whenever possible to summarize the impacts and simplify the text.

The NEPA and CEQA assessments shall reach specific, separate conclusions about significance for each impact based on the significance criteria and methods defined in the NEPA and CEQA subsections of Section 3.16.4. For example:

> *The permanent construction of a large HSR aerial structure for the through-town alignment and local station would introduce a substantial, new visual element to the existing cultural environment affecting many types of neighbors (such as residential, institutional, civic, retail and commercial neighbors). The aerial structure would be out of scale and character with the local downtown area, which would be perceived as the project resulting in cultural disorder within the landscape unit. The downtown area is pedestrian in scale and has an old-fashioned charm that is articulated in the nature of the storefront architecture and materials, street signs, and landscape furniture and plantings. The appearance of the aerial structure would contrast with the small, quaint character of the buildings and streets in the downtown area through its physical size, scale, modern architecture and materials.*
>
> *<u>NEPA Effect</u>*
>
> *The impact is adverse under NEPA as the project would result in adverse impacts on visual quality by resulting in a major, incompatible change to the cultural environment that would adversely affect many types of neighbors, who would be sensitive to the change. – The significance of this impact would be dependent upon the success of mitigation in reducing the impact.*
>
> <u>CEQA Conclusion</u>
>
> *Under CEQA, this is considered a significant impact as it would substantially degrade the existing visual character or quality of the site and its surroundings.*

3.16.8 Mitigation Measures

General formatting and terminology for constructing the discussion of mitigation measures is provided in Section 3.0.7, Mitigation Measures. The following direction is specific for the evaluation of Aesthetics and Visual Quality. Present the mitigation measures associated with the project alternatives within each geographic segment under the subheadings of Construction Measures and Operations Measures. The heading structure for the Aesthetics and Visual Quality EIR/EIS discussion is shown in Section 3.16.12. Give each mitigation measure a short descriptive

title and a number, such as *AVQ-MM #1,* which corresponds to the primary significant impact for which the measure is proposed (if practical).

Develop project-level measures that are consistent with adopted program and project strategies that avoid or minimize impacts. Begin by considering programmatic mitigation strategies described in Section 3.0.7, as well as the following resource specific guidance, as applicable to the HSR project section:

- The aesthetic and visual quality-related technical reports and environmental document sections in the most recent environmental documents produced by the Authority (e.g., *Fresno to Bakersfield Section Final EIR/EIS*, or more recent HSR project EIR/EIS)
- FHWA *Guidelines for the Visual Impact Assessment of Highway Projects* (FHWA HEP-15-029), Mitigation Measure/Best Practice
- Locally applicable design guidelines

Identify section-specific measures to mitigate any significant impacts, such as:

- Location, construction methods, aesthetic treatments, natural materials, view screening or enhancement, that reduce visual effects, highlight positive elements, and compliment local values
- Location, staging, blending of construction equipment, materials, and activities to reduce their visibility (e.g., locating or storing materials and equipment within existing industrial or vacant areas to blend activities with existing uses)
- Art, theming, lighting, local design or other measures that lend to an iconic character as applicable to local context and character

Draft the mitigation measures to facilitate transition into the Mitigation Monitoring and Enforcement Plan by identifying responsibility and timing for implementation, as appropriate. For example: *The project proponent will work with the local agency during the project's final design phase to develop context-specific design criteria to increase the compatibility of the large aerial structures with smaller-scale environments. The design criteria may include requirements for architectural materials, landscaping, hardscape, and street furniture that would address the project's coherence with the existing visual character. The design criteria will be incorporated to the HSR project's final design plans, and implemented during project construction, to help integrate the new project components with the existing visual environment.*

3.16.9 Impacts from Implementing Mitigation Measures

General guidance for constructing the discussion of impacts from implementing mitigation measures is provided in Section 3.0.8, Impacts from Implementing Mitigation Measures.

Consider and disclose both positive and negative impacts of mitigation measures as part of the environmental analysis. For example, replacement planting of heritage trees off-site, while ensuring maintenance of an urban forest (beneficial effect) would not address a loss of heritage trees within the project area (adverse effect). Evaluate all mitigation measures, including off-site measures, using the methods in Section 3.16.4. Determine probable impacts using actual, on-the-ground analysis and describe the substantial basis for analytical conclusions (including defined thresholds or other criteria).

When the impacts of mitigation measures cannot be quantified (e.g., at a specific location, in a definite extent, at a particular time or duration, or measurable alteration of the affected resource), evaluate potential impacts using clearly described assumptions based upon reasonably foreseeable outcomes. An example is the relocation of a local landmark without an identified relocation site. In this case, make reasonable assumptions about the potential relocation site and improvements required, and note the impacts caused by the relocation, such as changes in

community perception (may be positive or negative), shifts in visitor patterns or needs, or changes in visual context and character.

3.16.10 Impacts Summary

3.16.10.1 NEPA Impacts

The overall structure and content of this discussion is presented in Section 3.0.9.1, NEPA Impacts. The heading structure for this organizational scheme is shown in Section 3.16.12. Use maps, as appropriate, to show locations of significant impacts of alternatives by segment.

3.16.10.2 CEQA Significance Conclusions

The overall structure and content of this discussion is presented in Section 3.0.9.2, CEQA Significance Conclusions. The heading structure for this organizational scheme is shown in Section 3.16.12. Use maps, as appropriate, to show locations of significant unavoidable impacts of alternatives by segment.

3.16.11 Products

The HSR RC is responsible for preparing the following products, under Authority and FRA direction, according to PMT guidance and subject to PMT quality control and assurance.

3.16.11.1 Technical Report or Appendix

In addition to the Volume 1 impacts analysis chapter, provide technical reports and Volume 2 appendices where full analysis applicable to the HSR project section requires details in excess of efficient inclusion in the EIR/EIS Volume 1 chapter. For example:

1. Volume 2, Appendix 2-E, Project Impact Avoidance and Minimization Features Analysis
2. Volume 2, Appendix 3.1-B, Regional and Local Policy Inventory
3. Volume 2, Appendix 3.16-A, Aesthetics and Visual Quality-related Appendices in recent EIR/EIS
4. Aesthetics and Visual Quality-related Technical Report

3.16.11.2 Project EIR/EIS Volume 1

1. Summary/Table for EIR/EIS Executive Summary
2. Project Description—Aesthetics and Visual Quality-related Components
    a. Impact Avoidance and Minimization Features
    b. Summary Table of Impact Avoidance and Minimization Features, and Project Impacts
3. Affected Environment, Environmental Consequences and Mitigation Measures Section: Aesthetics and Visual Quality
4. Affected Environment, Environmental Consequences and Mitigation Measures Section: Cumulative Impacts

3.16.12 Aesthetics and Visual Quality EIR/EIS Outline

The RC shall use the following outline for organizing content related to the Aesthetics and Visual Quality section in Chapter 3 of the project EIR/EIS, using the heading hierarchy and format as indicated. The RC shall consider the impacts of implementing mitigation measures as part of Section 3.16.8.

3.16 Aesthetics and Visual Quality

- 3.16.1 Introduction
- 3.16.2 Laws, Regulations, and Orders
  - 3.16.2.1 Federal
  - 3.16.2.2 State
  - 3.16.2.3 Regional and Local
- 3.16.3 Regional and Local Policy Analysis
- 3.16.4 Methods for Evaluating Impacts
  - 3.16.4.1 Definition of Resource Study Area
  - 3.16.4.2 Method for Determining Significance under NEPA
  - 3.16.4.4 Method for Determining Significance under CEQA
- 3.16.5 Affected Environment
  - 3.16.5.1 Project Subsection 1
    - Alternative 1
    - Alternative 2
    - Alternative 3
    - Alternative N
  - 3.16.5.2 Project Subsection 2
    - Alternative 1
    - Alternative 2
    - Alternative 3
    - Alternative N
  - 3.16.5.3 Project Subsection 3
    - Alternative 1
    - Alternative 2
    - Alternative 3
    - Alternative N
  - 3.16.5.4 Project Subsection N
    - Alternative 1
    - Alternative 2
    - Alternative 3
    - Alternative N
- 3.16.6 Environmental Consequences
  - 3.16.6.1 Overview
  - 3.16.6.2 Project Subsection1
    - No Project
    - Alternative 1
      - Construction Impacts
      - Operations Impacts
    - Alternative 2
      - Construction Impacts
      - Operations Impacts
    - Alternative 3
      - Construction Impacts
      - Operations Impacts
    - Alternative N
      - Construction Impacts
      - Operations Impacts
  - 3.16.6.3 Project Subsection 2
    - No Project
    - Alternative 1
      - Construction Impacts
      - Operations Impacts
    - Alternative 2

Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.16.6.4 Project Subsection 3
No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.16.6.5 Project Subsesction N
No Project
Alternative 1
Construction Impacts
Operations Impacts
Alternative 2
Construction Impacts
Operations Impacts
Alternative 3
Construction Impacts
Operations Impacts
Alternative N
Construction Impacts
Operations Impacts
3.16.7 Mitigation Measures
3.16.7.1 Project Subsection1
Alternative 1
Construction Measures
Operations Measures
Alternative 2
Construction Measures
Operations Measures
Alternative 3
Construction Measures
Operations Measures
Alternative N
Construction Measures
Operations Measures
3.16.7.2 Project Subsection 2
Alternative 1
Construction Measures

3.16.9.2 Alternative 2

Construction Impacts

Operations Impacts

3.16.9.3 Alternative 3

Construction Impacts

Operations Impacts

3.16.9.4 Alternative N

Construction Impacts

Operations Impacts

3 CULTURAL RESOURCES

3.17 Cultural Resources

The following provides practical guidance and usable content for developing the EIR/EIS cultural resources (CR) section. Section 3.0, General Methodology Guidance for Resource Sections, provides the methodological framework common to the evaluation of all resource areas. Section 3.19, Cumulative Impacts, provides the cumulative impact analysis methodology. Use Section 3.0 and Section 3.19 in combination with this CR guidance section when developing the EIR/EIS analysis.

Practical guidance and usable content are provided. Guidance is shown in black text and tables, while usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas of the section. Text in gray-shaded fields or *italics* needs to be customized based on project-section-specific information, including timing of technical studies, information collection, or preparation of deliverables. The methods are organized to mirror the organization of the EIR/EIS section or chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

If a discrepancy exists between the material in this guidance or the programmatic agreement (PA) and any adopted federal and state agency guideline or manual applicable to CR, the CR Regional Consultant (RC) or Environmental and Engineering Consultant (EEC) should identify and discuss such discrepancies with the California High-Speed Rail Authority (Authority), the Federal Railroad Administration (FRA), or the Rail Delivery Partners (RDP) before deviating from this guidance.

3.17.1 Introduction

The general method for preparing an introduction for this section is provided in Section 3.0.1, Introduction. The following discussion presents direction specific to CR.

Refer specifically to related content in other sections of the EIR/EIS that influence or are influenced by the cultural resources impact analysis, including the Section 4(f) analysis and Visual Quality analysis. Include citations to the lowest level sub-heading e.g., 3.X.X for text references and documents. The following red text can be used when preparing the Introduction.

This section describes known and potential impacts on cultural resources that would result from implementation of the California High-Speed Rail (HSR) [identify appropriate section] Project Section. Cultural Resources include prehistoric- and historic-era archaeological resources; architectural/built-environment resources; and traditional cultural properties that are listed or found eligible for the National Register of Historic Places (NRHP) and/or the California Register of Historical Resources (CRHR). Precontact archaeological sites are places where Native Americans lived or carried out activities during the prehistoric period (as late as A.D. 1769), and may contain artifacts, cultural features, subsistence remains, and human burials. Historic-era archaeological sites are post-European contact sites that may include remains of early settlements—features such as wells, privies, and foundations—that have the potential to address relevant research questions for the region. Historic architectural/built-environment resources include buildings, structures, objects, landscapes, districts, and linear features. Traditional cultural properties are places important to Native Americans or other living communities or ethnic groups. This section identifies cultural resources, assesses potential effects of the [insert name] Project Section on cultural resources, and identifies mitigation measures to reduce or eliminate effects on those resources in the study area (the area in which impacts may occur). Section 3.9, Geology, Soils, Seismicity, and Paleontological Resources discusses paleontological resources.

This section begins by describing the regulatory framework governing cultural resources in the context of high-speed rail construction and operation, followed by an overview of the methods used to identify the types of cultural resources in the study area or area of potential effect (APE). The types of resources occurring in the project area are then described, along with a description of the area's sensitivity to previously unidentified archaeological resources. Finally, the

anticipated effects or impacts of the [insert name] Project Section on cultural resources are evaluated, followed by the identification of mitigation that will be implemented to avoid or lessen those effects or impacts.

Studies conducted in the preparation of this chapter followed those prescribed by Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, which requires that effects on historic properties be taken into consideration in any federal undertaking. ("Undertaking" is the Section 106 term for "project". For consistency, "project" will be used throughout this chapter.) These studies include the results of background literature and records research, pedestrian field surveys, and consultations with the Native American community, the State Historic Preservation Officer (SHPO), other interested parties and local, state, or federal agencies to date. The results of these studies and the anticipated project effects are described here.

Five other resource sections in this [insert name] Project Section [Draft/Final] EIR/EIS also provide additional information related to cultural resources:

- **Section 3.4, Noise and Vibration**—Impacts of implementing the [insert name] Project Section [preferred alternative/alternatives] on cultural resources resulting from damage caused by vibration and disturbance caused by noise.
- **Section 3.10, Hazardous Materials and Wastes**—Impacts of implementing the [insert name]Project Section [preferred alternative/alternatives] resulting from hazardous materials on land uses more prone to specific contamination concerns, such as historical land use.
- **Section 3.12, Socioeconomics, Communities, and Environmental Justice**—Impacts of implementing the [insert name] Project Section [preferred alternative/alternatives] resulting from station locations in close proximity to historical buildings and facilities.
- **Section 3.16, Aesthetics and Visual Resources**—Impacts of implementing the [insert name] Project Section [preferred alternative/alternatives] on the visual context and setting of historic properties that contribute to its historic significance.
- **Section 4, Section 4(f) and Section 6(f) Evaluations**—Impacts of implementing the [insert name]Project Section [preferred alternative/alternatives] on historic properties that may be subject to 4(f) use and, consequently, least harm analysis.

3.17.2 Laws, Regulations, and Orders

The primary applicable federal and state laws and regulations protecting cultural resources are Section 106 of the NHPA, as amended, the National Environmental Policy Act (NEPA), Section 4(f) of the Department of Transportation Act of 1966, the California Environmental Quality Act (CEQA), and California Public Resources Code (Cal. Public Res. Code) Sections 5024.1 and 21084.1. These and other federal and state laws and regulations that pertain to cultural resources are described below, as are regional and local planning guidance and ordinances.

If any of the following laws, regulations and orders do not apply to the subject section, do not include them.

California and federal laws exempt from disclosure information regarding the location of Native American archaeological and other culturally sensitive sites. Therefore the locations of such sites are not included in this chapter. Specifically, California Public Records Act exempts from public disclosure the records of Native American graves, cemeteries, sacred places, features, and objects described in sections 5097.9 and 5097.933 of the Cal. Public Res. Code (Gov. Code §6254, subd.[r]). The act also exempts from public disclosure records that relate to archaeological site information and reports maintained by or in the possession of the California Department of Parks and Recreation, the State Historical Resources Commission, the California State Lands Commission, the Native American Heritage Commission (NAHC), other state agencies, or local agencies, including the records that agencies obtain through a consultation process with a California Native American tribe (Gov. Code § 6254.10). In addition, CEQA Guidelines prohibit inclusion of information about the location of archaeological sites and Sacred Lands in an environmental impact report (EIR) (CEQA Guidelines § 15120, subd. [d]). Federal law also

exempts from disclosure information pertaining to sensitive cultural resource information (16 United States Code [U.S.C.] 470w-3(a) and 16 U.S.C. 470w-3(b)).

3.17.2.1 Federal

National Environmental Policy Act

The National Environmental Policy Act of 1969 (NEPA), as amended, establishes the federal policy of protecting important historic, cultural, and natural aspects of our national heritage during federal project planning. All federal or federally assisted projects requiring action pursuant to Section 102 of NEPA must take into account the effects on cultural resources. According to the NEPA regulations, in considering whether an action may "significantly affect the quality of the human environment," an agency must consider, among other things, unique characteristics of the geographic area such as proximity to historic or cultural resources (40 Code of Federal Regulations [C.F.R.] § 1508.27[b][3]) and the degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places (NRHP).

The NEPA regulations also require that, to the fullest extent possible, agencies shall prepare draft Environmental Impact Statements (EIS) concurrently with and integrated with environmental impact analyses and related surveys and studies required by the NHPA. When Section 106 of the NHPA and NEPA are integrated, project impacts that cause adverse effects under Section 106 are usually considered to be significant under NEPA.

National Historic Preservation Act [16 United States Code (U.S.C.) Section 470 et seq.]

The NHPA establishes the federal government policy on historic preservation and the programs, including the NRHP, through which this policy is implemented. Under the NHPA, significant cultural resources, referred to as “historic properties,” include any prehistoric or historic district, site, building, structure, or object included in, or determined eligible for inclusion in, the NRHP. Historic properties also include resources determined to be National Historic Landmarks (NHL). NHLs are nationally significant historic places designated by the Secretary of the Interior (SOI) because they possess exceptional value or quality in illustrating or interpreting United States heritage. A property is considered historically significant if it meets one of the NRHP criteria and retains sufficient historic integrity to convey its significance. This act also established the Advisory Council on Historic Preservation (ACHP), an independent federal agency that administers Section 106 of the NHPA by developing procedures to protect cultural resources included in, or eligible for inclusion in, the NRHP. Regulations are published in 36 Code of Federal Regulations (C.F.R.) Parts 60, 63, and 800.

36 C.F.R. Part 800 Implementing Regulations for Section 106 of the National Historic Preservation Act

Section 106 requires that effects on historic properties be taken into consideration in any federal project. The process has four steps: (1) initiating the Section 106 process, which includes identifying and initiating consultation with Native American tribes, local governments, and other interested parties, (2) identifying historic properties, (3) assessing adverse effects, and (4) delineating stipulations by which to resolve adverse effects in an agreement document.

Section 106 affords the ACHP and the SHPO, as well as other consulting parties, a reasonable opportunity to comment on any project that would adversely affect historic properties. SHPOs administer the national historic preservation program at the state level, review NRHP nominations, maintain data on historic properties that have been identified but not yet nominated, and consult with federal agencies during Section 106 review.

The National Register eligibility criteria (36 C.F.R. Section 60.4) was used to evaluate historic significance of resources within the project’s APE. The criteria for evaluation are as follows:

a) [properties] that are associated with events that have made a significant contribution to the broad patterns of our history; or

b) [properties] that are associated with the lives of persons significant to our past; or

c) [properties] that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master; or that possess high artistic values; or that represent a significant and distinguishable entity whose components may lack individual distinction; or

d) [properties] that have yielded, or may be likely to yield, information important in prehistory or history.

Section 101(d)(6)(A) of the NHPA allows properties of traditional religious and cultural importance to a Native American tribe to be determined eligible for NRHP inclusion. In addition, a broader range of traditional cultural properties (TCP) are also considered and may be determined eligible for or listed in the NRHP. TCPs are places that may be eligible because of their association with cultural practices or beliefs of living communities that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community. In the NRHP programs, "culture" is understood to mean the traditions, beliefs, practices, customary ways of life, arts, crafts, and social institutions of any community, be it an Indian tribe, a local ethnic group, or the nation as a whole.

The High-Speed Rail (HSR) program-wide approach to Section 106 has been defined in the Programmatic Agreement among the FRA, the ACHP, the SHPO, and the Authority regarding Compliance with Section 106 of the NHPA, as it pertains to the California High-Speed Rail Project (PA 2011). The PA provides an overall framework for conducting this project's Section 106 process, including guidance for establishing the APE, interested party and tribal consultation, survey and evaluation, and outlines the approach for the treatment of historic properties, including guidance on developing memoranda of agreement (MOA) and treatment plans (archaeological and built resources) to address the resolution of adverse effects for each section of the project.

Section 4(f) of the Department of Transportation Act (49 U.S.C. Section 303)

Section 4(f) of the Department of Transportation Act of 1966, codified in federal law at 49 U.S.C. 303, prohibits use of a publicly owned park, recreation area, wildlife or waterfowl refuge, or publicly or privately owned historic site of national, state or local significance for a transportation project unless the Secretary of Transportation has determined that there is no feasible and prudent alternative to such use and the project includes all possible planning to minimize harm to the property resulting in such use.

"Use" in Section 4(f) is when the transportation project requires a physical taking or other direct control of the land for the purposes of a project. 4(f) use also includes adverse indirect impacts or "constructive use" when impacts substantially impair or diminish the activities, features, or attributes of the resources that contribute to its significance. A determination of a "de minimis" impact to a Section 4(f) historic property is when there is a Section 106 finding of no adverse effect on a historic property.

Procedures for Considering Environmental Impacts (64 Fed. Reg. 28545)

These Federal Railroad Administration (FRA) procedures state that an EIS should consider possible impacts on locations of historic, archaeological, architectural, or cultural significance.

Archaeological and Historic Preservation Act [16 U.S.C. Sections 469 to 469(c)-2]

This act provides for preserving significant historic or archaeological data that may otherwise be irreparably lost or destroyed by construction of a project by a federal agency or under a federally licensed activity or program. This includes relics and specimens.

American Antiquities Act [16 U.S.C. Sections 431 to 433]

The American Antiquities Act prohibits appropriation, excavation, injury, or destruction of "any historic or prehistoric ruin or monument, or any object of antiquity" located on lands owned or controlled by the federal government. The act also establishes penalties for such actions and sets forth a permit requirement for collection of antiquities on federally owned lands.

American Indian Religious Freedom Act [42 U.S.C. Section 1996]

The American Indian Religious Freedom Act protects and preserves the traditional religious rights and cultural practices of American Indians, Eskimos, Aleuts, and Native Hawaiians. The act requires policies of all governmental agencies to respect the free exercise of native religion and to accommodate access to and use of religious sites to the extent that the use is practicable and is not inconsistent with an agency's essential functions. If a place of religious importance to American Indians may be affected by an project, the American Indian Religious Freedom Act promotes consultation with Indian religious practitioners, which may be coordinated with Section 106 consultation.

Archaeological Resources Protection Act (ARPA) [16 U.S.C. 470]

This statute was enacted to secure, for the present and future benefit of the American people, the protection of archaeological resources and sites which are on public lands and Indian lands. It was also enacted to foster increased cooperation and exchange of information between governmental authorities, the professional archaeological community, and private individuals (Sec.2(4)(b)).

Native American Grave Protection and Repatriation Act (NAGPRA) [25 U.S.C. 3001-3013]

NAGPRA describes the rights of Native American lineal descendants, Indian tribes, and Native Hawaiian organizations with respect to the treatment, repatriation, and disposition of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony, referred to collectively in the statutes as cultural items, with which they can show a relationship of lineal descent or cultural affiliation. One purpose of the statute is to provide greater protection for Native American burial sites and more careful control over the removal of Native American human remains, funerary objects, sacred objects, and items of cultural patrimony on federal and tribal lands.

Presidential Memorandum, Government-to-Government Relations with Native American Tribal Governments, April 29, 1994

Directed to the heads of executive departments and agencies, this memorandum outlines the principles that are to be followed in interactions with the governments of federally recognized Native American tribes. It includes provisions for government-to-government relations, consultation, and requires assessment of the impact of federal government plans, projects, programs, and activities on tribal trust resources and assurance that tribal government rights and concerns are considered during the development of such plans, projects, programs, and activities.

Executive Order 13175, Consultation with Indian Tribal Governments

This order establishes regular and meaningful consultation and collaboration with officials of federally recognized Indian tribes in the development of federal policies that have tribal implications, to strengthen the government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes. It sets forth guiding principles for government-to-government relations with Indian tribes, along with criteria for formulating and implementing policies that have tribal implications.

U.S. Department of Transportation Tribal Consultation Plan (DOT Order 5301.1)

In response to Executive Order 13175, this plan states that as an executive agency, the U.S. Department of Transportation has a responsibility and is committed to working with the governments of federally recognized Indian tribes in a unique relationship, respecting tribal sovereignty and self-determination. The plan identifies specific goals, including establishing direct contact with Indian tribal governments at reservations and tribal communities and seeking tribal government representation in meetings, conferences, summits, advisory committees, and review boards concerning issues with tribal implications.

3.17.2.2 State

California Environmental Quality Act (CEQA), Public Resources Code Section 21083.2 and CEQA Guidelines California Code of Regulations (CCR), Title 14, Section 15064.5

CEQA requires the lead agency to consider the effects of a project on historical resources. CEQA Guidelines Section 15064.5 provides specific guidance for determining the significance of impacts on historical resources (CEQA Guidelines §15064.5(b)), and unique archaeological resources (CEQA Guidelines §15064.5(b) and Cal. Public Res. Code §21083.2). Under CEQA these resources are called "historical resources" whether they are of historic or prehistoric age. CEQA Public Resources Code §21084.1 defines historical resources as those listed, or eligible for listing, in the California Register of Historical Resources (CRHR), or those listed in the historical register of a local jurisdiction (county or city) unless the preponderance of the evidence demonstrates that the resource is not historically or culturally significant. NRHP-listed "historic properties" located in California are considered historical resources for the purposes of CEQA and are also listed in the CRHR. The CRHR criteria for listing such resources are based on, and are very similar to, the NRHP criteria. CEQA Cal. Public Res. Code Section 21083.2 and CEQA Guidelines Section 15064.5(c) provide further definitions and guidance for archaeological sites and their treatment.

Different legal rules apply to the two different categories of cultural resources, though the two categories sometimes overlap where a "unique archaeological resource" also qualifies as an "historical resource." In such an instance, the more stringent rules for the protection of archaeological resources that are historical resources apply.

Section 15064.5 also prescribes a process and procedures for addressing the existence of, or probable likelihood, of Native American human remains, as well as the unexpected discovery of any human remains during implementation of a project. This includes consultations with appropriate Native American tribes.

Guidelines for the implementation of CEQA define procedures, types of activities, persons, and public agencies required to comply with CEQA. Section 15064.5(b) prescribes that project effects that would "cause a substantial adverse change in the significance of an historical resource" are significant effects on the environment. Substantial adverse changes include physical changes to both the historical resource and its immediate surroundings.

Section 15126.4(a)(1) states that an environmental impact report (EIR) shall describe feasible measures which could minimize significant adverse impacts. Section 15126.5(b) describes mitigation measures related to impacts on historical resources.

California Register of Historical Resources (Cal. Public Res. Code Section 5024.1 and 14 California Code of Regulations Section 4850)

Cal. Public Res. Code Section 5024.1 establishes the CRHR. The register lists all California properties considered to be significant historical resources. The CRHR also includes all properties listed or determined eligible for listing in the NRHP, including properties evaluated and determined eligible under Section 106. The criteria for listing on the CRHR, criteria 1-4, are similar to those of the NRHP:

1) [resources that are] associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage; or
2) [resources that are] associated with the lives of persons important in our past; or
3) [resources that] embody the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic value; or
4) [resources that have] yielded, or may be likely to yield, information important in prehistory or history.

The CRHR regulations govern the nomination of resources to the CRHR (14 CCR Section 4850). The regulations set forth the criteria for eligibility as well as guidelines for assessing historical integrity and resources that have special considerations.

California Native American Graves Protection and Repatriation Act (California Health & Safety Code Section 8010 et seq.)

The California Native American Graves Protection and Repatriation Act establishes a state repatriation policy consistent with and facilitates implementation of the federal Native American Graves Protection and Repatriation Act. The act strives to ensure that all California Native American human remains and cultural items are treated with dignity and respect, and asserts intent for the state to provide mechanisms for aiding California Native American tribes, including non-federally recognized tribes, in repatriating remains.

California Tribal Cultural Resources and Consultation (Assembly Bill 52, Chapter 532) *Include this ONLY if a notice of preparation (NOP) had not been filed for the project section prior to July 1, 2015.*

Assembly Bill (AB) 52 became law on January 1, 2015. It establishes a formal consultation process for California Indian tribes as part of CEQA and equates significant impacts on tribal cultural resources with significant environmental impacts. Several new Public Resources Codes (Cal. Public Res. Code) have been written to codify the law's requirements. Cal. Public Res. Code Section 21074 defines a California Native American Tribe as a tribe located in California that is on the contact list maintained by the Native American Heritage Commission. It also defines what types of resources are to be considered tribal cultural resources. Cal. Public Res. Code Section 21080.3.1 describes formal tribal consultation requirements; Cal. Public Res. Code Section 21080.3.2 provides that if the California tribe requests consultation to include project alternatives and mitigation measures, such consultation would be required; Cal. Public Res. Code Section 21082.3 provides that any mitigation measures agreed upon during consultation shall be recommended for inclusion in the environmental document and affirms the lead agency's obligation to keep confidential any information obtained from a Native American tribe during the consultation process; and Cal. Public Res. Code Section 21083.4 provides examples of mitigation for impacts to Tribal Cultural Resources.

State-owned Historical Resources (Cal. Public Res. Code Section 5024 and 5024.5) *Include this ONLY if there are state-owned historical resources or California Historic Landmarks within this project section.*

Under California Public Resources Code (Cal. Public Res. Code) section 5024(f), a state agency must provide notification and submit to the SHPO documentation for any project having the potential to affect state-owned historical resources listed in or potentially eligible for inclusion in the NRHP or registered as or eligible for registration as a California Historical Landmark (CHL). Cal. Public Res. Code section 5024(f) also applies to archaeological sites, landscapes, and other non-structural resources that are listed in or have been determined eligible for inclusion in the NRHP or are registered or determined eligible for registration as a CHL. Cal. Public Res. Code section 5024(f) further requires that state agencies request SHPO's comments and provides documentation of effects (i.e., No Historic Properties Affected, No Adverse Effect, or Adverse Effect) to NRHP listed/eligible or CHL registered/eligible archaeological sites, built resources, landscapes, and other non-structural historical resources.

Like Section 106 but unlike CEQA, Cal. Public Res. Code section 5024.5 uses the term "adverse effect" instead of "substantial adverse change" to describe effects on state-owned historical resources. Like Section 4(f) of the U.S. DOT Act, Cal. Public Res. Code section 5024.5 uses the terms "prudent and feasible" and requires state agencies to adopt prudent and feasible measures that will eliminate or mitigate the adverse effects on state-owned historical resources. Under Cal. Public Res. Code section 5024.5, state agencies must seek SHPO's concurrence early in the planning process by providing SHPO with a notice and summary documentation of projects

involving state-owned historical resources. As outlined in Cal. Public Res. Code section 5024.5, SHPO makes the determination as to whether an effect is adverse, not the state agency.

3.17.2.3 Regional and Local Plans, Policies, and Ordinances

Compile a complete inventory of adopted local and regional plans, ordinances, or guidelines related to cultural resources. These may include local planning guidance and ordinances, including general and specific plans, and historical/cultural resource district and protection ordinances. Should the list be greater than one page, please summarize the plans, ordinances, and guidelines here and place the full inventory in Volume 2, Appendix 3.17-B, Regional and Local Policy Inventory. Use a tabular format similar to that used in the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014), or more recent HSR project EIR/EIS, or as provided in Example Table A, to organize and concisely report this information. The following red text can be used when introducing this discussion.

This section identifies local planning guidance and ordinances, including general and specific plans, and historical or cultural resources protection ordinances. It is organized by county, immediately followed by cities within that county, to provide an overall framework for the geographic area. Table 3.17-1 summarizes the local plans, policies, and ordinances that were identified and considered in the preparation of this analysis.

Table 3.17-1 Regional and Local Plans, Policies, and Ordinances

Policy Title	Summary
City of Fresno	
2025 Fresno General Plan, Goals 3 and 11; Open Space and Recreation Element, Policy F-9-a; Resource Conservation Element, Objective G-10, Policies G-10-a through G-10-c, and G-11, Policies G-11-a through G-11-l (City of Fresno Planning and Development Department 2002)	*The General Plan includes goals to preserve and revitalize historical resources and to protect, preserve, and enhance significant archaeological and paleontological resources. Policy F-9-a directs recreational activities to be designed and managed to protect cultural resources, such as archaeological and Native American religious sites. Objective G-10 calls for the identification, recognition, and promotion of historic and cultural resources. Objective G-11 calls for preserving resources that reflect important cultural, social, economic, and architectural features so that Fresno community residents will have a foundation upon which to measure physical change.*

Source: [source info]
[enter notes (do not include term "Notes:")]

3.17.3 Regional and Local Policy Analysis

The overall structure of this discussion is presented in Section 3.0.3, Regional and Local Policy Analysis. As described in more detail in subsection 3.0.3.2, this analysis will identify any inconsistencies or conflicts with adopted regional or local policies and the implementation of the project. This section should describe the regional and local policy analysis information as it pertains to cultural resources. The following red text can be used to introduce this discussion.

Section 3.1.2, Regional and Local Policy Context describes state and regional policies supporting the California High-Speed Rail (HSR) system. Because the HSR project is an project of the Authority and FRA, in their capacities as state and federal agencies, it is not required to be consistent with local plans. The Council on Environmental Quality (CEQ) and FRA regulations, however, require the discussion of any inconsistency or conflict of a proposed action with regional or local plans and laws. Where inconsistencies or conflicts exist, the CEQ and FRA require a description of the extent of reconciliation and the reason for proceeding if full reconciliation is not feasible (40 C.F.R. Part 1506.2(d) and 64 Fed. Reg. 28545, 14(n)(15)). CEQA Guidelines also require that an EIR discuss the inconsistencies between the proposed project and applicable general plans, specific plans, and regional plans (CEQA Guidelines § 15125(d)).

If the project will prevent the fulfillment of a portion or the entirety of any local plan, please describe the plan and how the project will prevent the action, goal or plan identified.

Because the HSR project is a state and federal government project, it is not subject to local government jurisdictional issues of land use. Consequently, a city or county is not “an agency with jurisdiction over the project” as described in Appendix G of the CEQA Guidelines.

3.17.4 Coordination of Section 106 Process with NEPA and CEQA Compliance

The Advisory Council on Historic Preservation advises federal agencies to coordinate compliance with Section 106 of the NHPA and the procedures in the regulations implementing Section 106, with steps taken to meet the requirements of NEPA so that they can meet the purposes and requirements of both statutes in a timely and efficient manner. When NEPA review and Section 106 are integrated, ways to avoid, minimize, or mitigate adverse effects while identifying alternatives and preparing NEPA documentation can be assessed. Similarly, both CEQA Guidelines and NEPA regulations encourage the preparation of joint documents as a way to avoid duplication and delay and to coordinate measures to avoid, minimize, or mitigate impacts to historic resources. 36 CFR Part 800 defines the Section 106 process and documentation requirements, which substantially satisfies the requirements to comply with both NEPA and CEQA. Such measures are binding commitments documented in the EIR/EIS, as well as in compliance with Section 106 by the preparation of a Memorandum of Agreement (MOA). There are some specific CEQA and NEPA requirements that diverge from the Section 106 process; these exceptions are addressed in Section 3.17.5.3 of this chapter.

A Programmatic Agreement (PA) was executed in July 2011 to satisfy the requirements of Section 106 of the NHPA for the California HSR System. A PA is a document that records the terms and conditions agreed upon to resolve the potential adverse effects of a complex project, in accordance with Section 106 Part 800.14(b). The signatories of the PA include the FRA, the Authority, the ACHP, and the SHPO. The Surface Transportation Board (STB) and the United States Army Corps of Engineers (USACE) have subsequently been invited to become signatories.

The PA provides an overall framework for how the Authority and FRA will achieve compliance with Section 106 of the NHPA, and includes stipulations regarding the identification, evaluation, and treatment of historic properties; delineation of the Area of Potential Effect (APE); consultations with tribal governments, local agencies and interested parties; and standards for technical documentation.

3.17.4.1 Section 106 Technical Studies Prepared for the Project

Briefly describe the technical studies that were prepared to support the EIR/EIS. Update the descriptions as the EIR/EIS moves from draft to final. Example Table 3.17-2 should include the reports that were prepared for the section and the SHPO concurrence dates. Update and add to the table as needed between the draft and final EIR/EIS. Omit Historic Property Survey Report from the table and following discussion if you have been directed to not produce one.

Table 3.17-2 Section 106 Technical Reports and Concurrence Dates

Report Title	Date	SHPO Concurrence Date
Archaeological Survey Report		
Historic Architecture Survey Report		
Historic Property Survey Report		
Finding of Effect		
Memorandum of Agreement		

[enter notes (do not include term "Notes:")]

The above listed reports document the FRA and Authority's compliance with Section 106 of the NHPA. As stated in section 3.17.4, the Section 106 process and documentation requirements substantially satisfy the requirements to comply with both CEQA and NEPA. In general, the Archaeological Survey Report (ASR) documents research efforts, known archaeological sites, newly discovered archaeological sites if any are identified, and consultation efforts with Native American tribes. The Historic Architecture Survey Report (HASR) documents research efforts, known historic built resources, newly identified historic built resources, and consultation efforts with historical interest groups. *The Historic Property Survey Report (HASR) distills the findings in the ASR and HASR into tables and works as a cover report for both.* The Finding of Effect (FOE) documents how the [insert name] Project Section will affect historic properties – both archaeological and built. These documents inform the findings described in this chapter.

Update the following paragraph accordingly when the EIR/EIS moves from draft to final.

Stipulation VIII.A of the PA requires that a Memorandum of Agreement (MOA) be developed by the Authority for each project where the FRA determines there would be an adverse effect to historic properties or when phased identification is necessary and adverse effects would occur. The MOA documenting agreement on the treatment of historic properties within the [insert name] Project Section [will be/is being/has been]developed with input from consulting parties (Table 3.17-3), and will be executed concurrently with the completion of the final EIR/EIS and the Record of Decision (ROD) by the FRA. Following the execution of the MOA, and in accordance with PA Stipulations VIII.B.i and VIII.B.ii, treatment plans—one for archaeological resources and one for historic built resources—will be developed by the Authority to detail the treatment measures negotiated for all historic properties within the [insert name] Project Section. The Archaeological Treatment Plan (ATP) and Built Environment Treatment Plan (BETP) will define the process by which these treatment measures will be applied to each known resource identified in the MOA as being adversely affected, and will also outline measures for the phased identification of historic properties as additional parcel access is obtained and design work is completed. The MOA and treatment plans provide specific performance standards that ensure each adverse effect will be avoided, minimized, or mitigated. The measures stipulated in the Section 106 consultation process have been coordinated with the measures outlined in this EIR/EIS. These measures will be incorporated into the design and construction documents to ensure they are incorporated into the project.

3.17.4.2 Agency, Native American, Interested Parties, and Public Outreach Efforts

CEQA, NEPA, and Section 106 of the NHPA each require that outreach regarding cultural resources be conducted to government agencies, Native Americans, and other parties who may have a demonstrated historic preservation interest in a project. The primary goals of this outreach is to help identify any cultural resources of concern to these parties and to provide them an opportunity to become Section 106 Consulting Parties to participate in the development of significance findings, assessments of effect/impact, and in the development of mitigation measures. For this reason, cultural resources outreach for the project began in the early scoping phase of the process. Consultation with the Section 106 Consulting Parties has remained ongoing throughout the environmental document preparation process, and will continue through the construction phase of the project during implementation of the MOA and Treatment Plans.

To the extent possible, the cultural resources outreach requirements for CEQA, NEPA, and Section 106 have been coordinated to identify interested parties early in the process to achieve maximum participation in identifying cultural resources, addressing impacts to cultural resources, and developing appropriate mitigation measures. Guiding documents include the PA, which describes the process for consulting with Native Americans and other interested parties. Specifically, Stipulation V.A. of the PA states that, "the public and consulting parties will have an opportunity to comment and have concerns taken into account on findings identified in Section 106 survey and effects documented via attendance at public meetings where they can submit comments on the information presented, as well as access to the Section 106 documents via email requests to the Authority's website." Furthermore, Stipulation V.C specifies that tribal

consulting parties shall be consulted at key milestones in the Section 106 and NEPA processes to gain input from the tribal governments.

Agency and Interested Party Outreach

Consultation with local, state, and federal agencies and other interested parties has been ongoing throughout the project planning process. Table 3.17-3 describes the contact information with these potentially interested parties and include *local government planning departments, historic preservation organizations, historical societies, libraries, and museums.* As per PA Stipulation V.A., these interested *agencies, groups and individuals* were invited to comment on the significance findings and treatments proposed, and those with demonstrated interest in the project [will be/have been] invited to participate as Consulting Parties in the preparation of the MOA. Table 3.17-3 also summarizes the outreach to *federal, state, regional, and local agencies* that may have responsibilities for historic properties and may want to review reports and findings for an project within their jurisdiction, as well as outreach to other potentially interested parties and individuals.

Update Table 3.17-3 between the draft and the final EIR/EIS.

Table 3.17-3 Summary of Outreach Efforts to Identify Agency and other Interested Consulting Parties

Action	Date	Summary	Type
Informational Update letter to Milliken Museum	*July 24, 2013*		*Informal informational status/update*

[enter notes (do not include term "Notes:")]

Native American Outreach and Consultation

The Authority and FRA seek to engage tribal governments in the early stages of project development and connect them closely with the cultural resources studies by affording them the opportunity to participate in the cultural resources investigations throughout the project delivery process. Cal. Public Res. Codes require consultation with Native American tribes. Cal. Public Res. Code 21080.3.1 requires a lead state agency to consult with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project; Cal. Public Res. Code 21080.3.2 requires that, as part of the consultation, the parties may propose mitigation measures capable of avoiding or substantially lessening potential significant impacts to a tribal cultural resource; and Cal. Public Res. Code 21082.3 requires that any mitigation measures agreed upon through this consultation shall be included in the environmental document. Consequently, tribal participation in the cultural resources studies in [insert name] Project Section includes tribal contributions to the identification of resources and/or culturally sensitive areas, participation in project alignment tours, and participation in pedestrian archaeological field surveys. Tribes also contribute to, review and may comment on cultural resources technical reports, and assist in the development of MOAs and Archaeological Treatment Plans. Tribal representatives monitor construction and archaeological excavations and collaborate on the development of meaningful mitigation options to address effects to significant cultural resources. The Authority and FRA rely on the NAHC to identify those Native American tribal governments with whom it is most appropriate to consult for a given geographical area. These include both federally recognized and non-federally recognized tribes. A revised/updated list of local tribes is regularly obtained from the NAHC to validate that the most current tribal contact information is used when communicating with tribal representatives. The tribes identified

as having interest in the [insert name] Project Section area have been consulted early and throughout the environmental review process to ensure they are kept informed and engaged about project changes and advances and to seek tribal input regarding any concerns about potential effects to important tribal cultural resources.

Table 3.17-4 summarizes the outreach with Native Americans undertaken to date for this section. Native American outreach and consultation efforts have been ongoing at key milestones throughout the project planning process. Both federally recognized tribes and non-federally recognized tribes were notified of the initiation of the Section 106 process for this section as outlined in Table 3.17-4 and were consulted during the preparation of the technical studies and MOA. Native American tribes have also been consulted about the APE and about potentially sensitive cultural and archaeological resources that could be present within the APE. The MOA [will include/includes] provisions for phased identification of archaeological resources because of limited access to perform pedestrian archaeological surveys. The Authority and FRA will continue to consult with Native American tribes and individuals after the ROD, as the previously inaccessible parcels are acquired, accessed, and surveyed.

Provide a bullet list of tribal governments contacted here.

Update Table 3.17-4 between the draft and final EIR/EIS.

Table 3.17-4 Summary of Outreach Efforts to Identify Native American Consulting/ Concurring Parties

Action	Date	Summary	Type
Informational Update letter to local tribes	*July 24, 2013*		*Informal informational status/update*

[enter notes (do not include term "Notes:")]

. As discussed in Section 3.17.2, California and federal laws exempt from disclosure information regarding the location of Native American archaeological and other culturally sensitive sites. Therefore the locations of such sites are not included in this chapter.

Consulting Parties

Table 3.17-5 presents the entities [, to date,] who [have elected to become/are] Section 106 Consulting Parties for the cultural resources investigation and the preparation of the MOA.

Logically organize this table and update it between the draft and final EIR/EIS if needed. In the draft EIR/EIS, add the above "to date." This table may include Native Americans, local agencies, historical interest groups, and/or individuals.

Table 3.17-5 Consulting Parties in the Preparation of the MOA

Name of Entity
Santa Clara Valley Transportation Authority

[enter notes (do not include term "Notes:")]

3.17.5 Methods for Evaluating Impacts

Methods for identifying and evaluating the significance of historic properties and historical resources, and assessing impacts on these properties and resources for [insert name] Project Section were conducted in accordance with the Section 106 PA, as well as with the Environmental Methodology Guidelines (version 5) developed by the Authority. Together these documents provide an overall framework for conducting the Section 106 process, including outreach and consultation efforts, delineation of the APE, historic properties identification procedures, assessment of adverse effects and treatment of historic properties, documentation standards, and state and federal agency oversight in compliance with the NHPA, as well as in compliance with NEPA and CEQA. The Finding of Effect (FOE) report documents the assessment of known and potential adverse effects to historic properties, as a result of project construction or operation.

3.17.5.1 Definition of Resource Study Areas

The Section 106 process uses the term "area of potential effect" (APE) for the study area established for cultural resources surveys and analyses. Regulations implementing Section 106 of the NHPA require that an APE be established by the lead agency for all federal projects (36 C.F.R. 800.4(a)(1)). The APE is the geographic area or areas within which an project may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist (36 C.F.R. Section 800.13(d)). Prior to establishing the APEs, during the early stages of project design, a study area was delineated to initiate pre-survey studies, including a records search at the California Historical Information System at the [insert name] Information Center, and preliminary archival research. [When the preferred alternative is identified/With the identification of the preferred alternative], two distinct APEs [will be/were] delineated for the purposes of this project, one for archaeology and one for architectural or built resources. The APEs [will be/were] delineated to consider both construction-related effects as well as operational effects. Both APEs [will be/were] established following guidelines provided for in PA Attachment B.

Discuss any changes that have been made to the APEs between draft and final EIR/EIS. The survey and impacts analysis under CEQA also used these APEs.

Archaeological APE

The APE for archaeological properties was established in accordance with Attachment B and Stipulation VI.A of the Section 106 PA. The archaeological APE is the area of ground proposed to be disturbed before, during, and after construction as well as during operation. Ground-disturbing activities may include, but are not limited to, excavation for the vertical and horizontal profiles of the alignment, station location footprints, geotechnical drilling, grading, cut-and-fill, easements, staging/laydown areas, utility relocation, borrow sites, spoils areas, temporary or permanent road construction, infrastructure demolition, biological mitigation areas, and all permanent rights-of-way (i.e., the project footprint).

Describe any other considerations that may have influenced the delineation, such as the inclusion of access points in largely rural areas with no existing rail line; grade separation features, including conforming with existing roads; or entire parcels because they would ultimately be purchased in their entirety; or any cushion to allow for flexibility for contractor needs; or for diversion areas for waterways. The vertical archaeological APE was delineated in coordination with project engineers and includes maximum depth of ground disturbance for various features of the project. The vertical archaeological APE for certain key features includes the following:

The following are examples. Replace with your section's specific features:

For at-grade sections of the alignment, up to 25 feet of fill would be added to support the HSR. To prepare for the fill, construction activities would include clearing and grubbing, which is expected to disturb the ground up to two feet below surface.

For elevated sections of the alignment, the depth of disturbance would depend on the geotechnical data for each substructure bent location.

Excavations down to 25 feet below surface are expected in existing utility locations in order to encase them in steel.

Expected ground disturbance for staging areas is up to three feet below surface.

Historic Built Resources APE

The historic built resources APE for the [insert name] Project Section includes all legal parcels intersected by the proposed HSR right-of-way for all alternatives considered in this EIR/EIS, including proposed ancillary features such as grade separations, stations, maintenance facilities, and construction staging areas. The built resources APE is larger than the project footprint. It is delineated to take into consideration indirect effects, such as visual, audible or atmospheric intrusions to a property, shadow effects, the potential for vibration-induced damage, or isolation of a property from its setting. Visual and audible changes have the potential to adversely affect character-defining features of some historic built resources. This methodology for establishing the historic built resources APE follows standard practices for the discipline. Attachment B of the PA and the Authority's *Cultural Resources Technical Guidance Memorandum #1* (Authority 2013) provide guidance in the delineation of the APE. Also in compliance with the PA, all legal parcels within the APE that contained buildings, structures, objects, sites, and districts that were at least 50 years of age at the time of the survey were studied. The surveys were conducted on [insert dates].

Describe any additional methodology used for the APE delineation as follows. Describe how the nature of the proposed project was taken into account, such as if it is an elevated structure or at grade if known, if the geography influenced the delineation, how large rural parcels were treated, and how the rural or urban setting, viewsheds, or other characteristics were considered. This methodology for establishing the Historic Architectural APE follows standard practices for the discipline, Attachment B of the PA, and the Authority's *Cultural Resources Technical Guidance Memorandum #1* (Authority 2013). The APE [will include/includes]:

- Properties within the proposed right-of-way.
- Properties where historic materials or associated landscape features would be demolished, moved, or altered by construction.
- Properties near the project where railroad materials, features, and activities have not been part of the historic setting and where the introduction of visual or audible elements may affect the use or characteristics of those properties that would be the basis for their eligibility for listing in the National Register.
- Properties near the project that were either used by a railroad, served by a railroad, or where railroad materials, features, and activities have long been part of their historic setting; but only in such cases where the project would result in a substantial change from the historic use, access, or noise and vibration levels that were present 50 years ago, or during the period of significance of a property, if different.
- Parcels that would be included when delineating an APE, even if they are empty or would otherwise be exempt per PA Attachment D. This provides a record of which properties were exempted; no other documentation of such properties is required.

Cultural Resources Data Sources

In [month(s) year(s)] records searches were conducted at the [insert name] California Historical Resource Information Center. [Add a table if multiple record searches were conducted.] Describe the area that was included in the record search, including any buffer, and how that buffer was determined, i.e. geography, arbitrary but sufficient to capture relevant information, concentrated urban (so smaller area), within existing rail corridor, etc. In addition to the records searches, a search of the Sacred Land File at the Native American Heritage Commission was requested on [insert date]. Describe results, including the date the information was received.

Describe other potential sources of cultural, archaeological, historic, and architectural resource information. Customize the following list, adding specifics such as which CHRIS Information Center was used, kinds of maps, names of previous studies, which counties provided lists, which county Assessor was contacted, which libraries, etc.:

- *California Historical Resource Information System Records*
- *Historical maps and photographs*
- *NRHP and CRHR listings*
- *Native American Heritage Commission (NAHC) Sacred Lands files*
- *Caltrans Historic Bridge Inventory and Caltrans District offices, Caltrans Transportation Library and History Center*
- *Historical railroad records*
- *Previous environmental studies within the study area*
- *City and county historic registers and landmark lists*
- *County Assessor building construction data*
- *Local and university libraries, historical societies, county museums, and planning offices*
- *Add others as appropriate*

3.17.5.2 Methods for Resource Identification

The approach to resource identification differs between archaeological resources and historic built or architectural resources. While both studies are initiated by a records search and general research to identify known historic resources and past studies, followed by field surveys, the process generally diverges at this point. This section should describe how historic properties were identified. Begin with a short summary of when surveys were conducted for both archaeology and architectural history. Followed by a general description of the process including, as appropriate: additional property specific research, evaluation, if other repositories were visited, and if continued consultation with interested parties or Native Americans occurred that provided additional information that assisted with the process.

Although an archaeological or historic built resource may not be listed in or determined to be eligible for listing in the NRHP, the CRHR, a local register of historic resources (pursuant to Section 5020.1[k] of the California Public Resources Code), or identified in a historic resources survey (meeting the criteria in Section 5024.1[g] of the Cal. Public Res. Code), a lead agency may determine it to be a historical resource as defined in Cal. Public Res. Code Section 5020.1(j) or 5024.1 for the purposes of CEQA, unless the preponderance of the evidence demonstrates that the resource is not historically or culturally significant.

Archaeology Methods

All surveys were conducted by archaeologists meeting the professional qualification standards as required in Stipulation III of the PA, and the Secretary of the Interiors Professional Qualification Standards (48 FR 44738-44739) (Appendix A to 36 CFR Part 61), referred to as Qualified Investigators (QI) in the PA.

Describe the results of the initial research, including how many previous studies have been undertaken within each APE, the percentage of the archaeological APE that has been previously surveyed, if the previous archaeological survey boundaries and the location of historic built resources were digitized and overlaid on the APE maps, list or summarize what recorded archaeological resources and built resources are within each APE, and which are in the records search area but outside of the archaeological APE. Do not include location of archaeology sites. Use tables if that is the most efficient way to present this information.

Archival research included a review of historical maps to identify areas where previously unrecorded historic-era archaeological resources might be found. *Sanborn Fire Insurance Maps published between [insert date] and [insert date] were geo-referenced and evaluated using GIS to assess the potential presence of historic-era archaeological deposits. Sanborn maps were generally available for all urban areas; where Sanborn maps were unavailable, historic aerials and United States Geological Survey (USGS) topographical quadrangle maps were reviewed.* Describe any other map research conducted and what was extrapolated. For example, if a map shows that modern redevelopment occurred, then most of the properties identified contain moderate to low sensitivity for associated archaeological features or deposits.

In addition to archival research and tribal outreach and consultation, intensive pedestrian archaeological surveys were conducted on [insert survey dates] where parcel access was granted. Prior to commencing with pedestrian surveys, archaeologists identified parcels that did not warrant survey, such as paved or heavily landscaped parcels, to focus requests for permission to enter on parcels that could provide adequate visibility for effective pedestrian surveys.

Stipulation VI.E of the PA provides for phased identification in situations where identification of historic properties cannot be completed, for instance, when private property owners deny permission to enter. In such cases, the development and implementation of a post-review identification and evaluation effort [has been/will be] stipulated in a MOA to ensure that the historic properties identification effort is completed once the properties become accessible and prior to construction. Describe archaeological field methods, including the percent of the APE that was surveyed for each alternative. Quantify the total acreage of the APE for all alternatives, how many acres were accessible (granted permits to enter or on public lands), and what percent of the total acreage that represents. Specify how many of these acres were surveyed, how many were not surveyed and why (e.g., isolated parcels/paved etc.). Describe in general what cultural deposits, if any, were observed, and qualify ground surface visibility. Also describe any additional identification efforts, such as test excavations or Extended Phase 1 excavations. The field procedures that guided the identification of archaeological sites encountered during the field investigation adhered to the PA as well as the standards of professional practice of archaeology (see Section 110 of the NHPA and the Secretary of the Interior's Standards and Guidelines for Identification of historic properties [Federal Register Volume 48, Page 44716]).The overarching approach to assessing the resources encountered in the field for the [insert name] Project Section and the guidance for establishing historic property exemptions were defined in the PA. The criteria for what constitutes an "isolate" and a "site," and the process for the initial evaluation of a given resource are the implementation of the criteria for exemption provided by Attachment D of the PA. Those resources encountered that qualified as exempt were reviewed under CEQA criteria and were found not to be historical resources or unique archaeological resources as defined by the CEQA guidelines.

Details of the pedestrian field surveys are documented in the archaeological survey report (ASR) prepared for the [insert segment name] (Authority and FRA [insert date]). Field inventory not completed prior to the ROD will follow the requirements in the MOA and be completed for the selected alternative when access has been granted and/or the parcels have been acquired.

Historic Architectural/Built Resources Methods

All surveys were conducted by architectural historians and/or historians meeting the professional qualification standards as required in Stipulation III of the PA, and the Secretary of the Interior's Professional Qualification Standards (48 FR 44738-44739) (Appendix A to 36 CFR Part 61).

As with the records search results discussed above, the locations of previously surveyed historic architectural resources were geo-referenced using GIS to identify parcels and known resources within the built resources APE. Provide any additional details regarding initial mapping of known surveys and resources.

QIs also collected additional information about built environment and historic architectural resources from the following sources: Customize the following list as needed.

- *National Register of Historic Places—Listed Properties and Determined Eligible Properties (National Park Service, DATE)*
- *Directory of Properties in the Historic Property Data File for [insert name of county/ies] (California Office of Historic Preservation [OHP], DATE)*
- *California Inventory of Historic Resources (OHP 1976)*
- *California Points of Historical Interest (OHP 1992)*
- *California Historical Landmarks (OHP 1996)*
- *Sanborn Fire Insurance Maps in urban areas*
- *Historical USGS quadrangles*

Detailed historic contexts, regional property typologies, and property-specific research were based on a wide range of primary and secondary materials. Research on the historic themes and survey population was conducted in both archival and published records, including, but not limited to [specify locations]*. Research also included published and digital versions of U.S. Census Bureau information, including population schedules (1850-1940) and agricultural schedules (1850-1880). In addition, research included review of previous cultural resources reports, historic-period maps, local- and state-level historical resources lists, city directories, and various newspaper and journal articles.* Add any other pertinent resources.

Once the historic architectural resources study area was defined, fieldwork began with reconnaissance-level survey on [insert date] and [insert date] to account for all potentially historic architectural resources within the study area. The reconnaissance survey included known resources to determine if they had been altered subsequent to their original recordation, and identified resources that would likely require evaluation in compliance with the PA. The reconnaissance-level survey identified [insert #] historic-era resources (built, or appear to have been built, in or before 19[XX]) within the study area. [insert #] of these properties had been previously listed or determined eligible for listing in the NRHP and CRHR and received SHPO concurrence. The remaining historic-era resources required study in compliance with the PA.

Once this survey population was established, research efforts were refined to confirm specific resource construction dates and to refine estimated dates. This research was conducted through *an online commercial database to review current county assessor property data, as well as a thorough review of Sanborn maps, railroad plat maps, USGS topographic quadrangle maps, county assessor records, historic aerial photographs,* and other pertinent documents. This research further refined the survey population to those resources built in or before 19[XX].

Intensive-level surveys were conducted on [insert date] and [insert date]. All properties containing buildings, structures, objects, districts, or linear features that were known to be built in or before 19[XX], in other words 50 years of age or older at the time of the survey per the PA, and properties of unknown age, were surveyed in accordance with PA Stipulation VI.B and PA Attachments C and D. Of these, [insert #] are eligible for listing in the NRHP and CRHR, leaving [insert #] that are ineligible for the NRHP and CRHR. [insert #] of these ineligible resources were documented on DPR 523 forms; the remaining [insert #] were subject to "streamlined" documentation in accordance with PA Attachment D and Cultural Resources Technical Guidance Memorandum #7 (Authority 2016) and required no further study per the PA. As the project footprint was further refined, the APE was delineated and included in the Historic Architectural Survey Report (HASR). For full details of the survey and resource descriptions, see [provide title and date of the HASR].

Revise the above as needed to describe the methods employed for the built environment survey including a complete discussion of the process for complying with the PA's provisions, Guidance Memo #7 for streamlined documentation, and exemptions for inventory and evaluation. Describe how the survey population was established, such as proximity to project-related activities, results of the records search and other research data, parcel data (including briefly identifying sources).

Describe also the methods employed for resources for which parcel data were not available or were not applicable to the property type (such as linear features).

If access issues prevented complete inventory, state the following:

Most surveys were conducted from the public right-of-way. However, because of this limited access not all properties could be observed for adequate documentation and evaluation. Stipulation VI.E of the PA allows for phased identification of historic properties, because permission to enter may not be granted until later project stages. Parcels containing built-environment resources built in or before 19XX require phased identification and are listed in the historic architectural survey report (HASR) (Authority and FRA DATE).

Consideration of the Presence of Traditional Cultural Properties

Both the historic built resources survey and archaeological survey included the consideration of the presence of traditional cultural properties (TCP). These are properties that can be defined generally as those that are eligible for inclusion in the NRHP because of their association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community. "Traditional" in this context refers to those beliefs, customs, and practices of a living community of people that have been passed down through the generations, usually orally or through practice. The traditional cultural significance of a historic property, then, is significance derived from the role the property plays in a community's historically rooted beliefs, customs, and practices. Unlike archaeological resources and sacred sites, these resources are not subject to federal and state non-disclosure laws. [insert #] such properties were identified in the historic built resources APE:

If more than three, list in bullet points. Otherwise, name them in the above paragraph. If none, then state that at the end of the above paragraph.

Adapt the following if there are any TCPs. [This property was/These properties were] studied and evaluated by an ethnographer and discussed in [insert name of report] (Authority and FRA 20[XX]). [This property is/These properties are] associated with the [insert name of community or group]. The TCP study included a preliminary literature review to inform the nature and structure of the interview questions, as well as to provide a context for understanding and interpreting the statements made by the interviewees. Historians or archaeologists conducted archival research on [this resource/these resources] and shared information with the ethnographer. Interviews with prominent members of the [insert name of community or group] were conducted on [insert date]. Of these potentially eligible TCPs, only [insert name(s)] is/are eligible for the NRHP.

Methods for Identifying Resources of Importance to Native Americans and Other Interested Parties

Describe the methods employed for identifying resources of importance to Native Americans and other interested parties.

As described in Section 3.17.4.2, the Authority has consulted Americans and other interested parties to obtain information regarding cultural resources of importance. [As a result of/Despite] this outreach, Native Americans and other interested parties [have/have not] notified the Authority regarding the existence of traditional cultural properties or other cultural resources that could be affected by the current project alternatives in this region. Insert other resources identified by interested parties as applicable and not subject to federal and state non-disclosure laws.

3.17.5.3 Methodology for Impact Analysis

As stated earlier, the Advisory Council on Historic Preservation advises federal agencies to coordinate compliance with Section 106 and the procedures in the regulations implementing Section 106, with steps taken to meet the requirements of NEPA. Consequently, the NRHP criteria for adverse effect, no adverse effect, or no effect to historic properties (36 C.F.R. Part 800.5) was used to evaluate effects to historic properties within the project's area of potential effect (APE). Properties that are listed on the NRHP or found eligible for the NRHP are listed on the California Register of Historical Resources and considered historical resources for the

purposes of CEQA. The findings were documented in a Finding of Effects (FOE) report; if there are no CEQA-only properties, do not include the following: *impacts to CEQA-only historical resources were also analyzed and presented in the FOE.* This analysis substantially satisfies the compliance requirements of both NEPA and CEQA; however, there are some specific CEQA and NEPA impact analyses that diverge from the Section 106 process.

Impact Analysis under NEPA

In considering whether an action may "significantly affect the quality of the human environment" under NEPA, an agency must consider, among other things, the unique characteristics of the geographic area. Such considerations include proximity of the project to historic or cultural resources [40 C.F.R. 1508.27(3)], and the degree to which the action may adversely affect districts, sites, highways, buildings, structures, or objects listed or eligible for listing, in the NRHP, and if the project may cause loss or destruction of significant scientific, cultural, or historical resources [40 C.F.R. 1508.27(8)].

Pursuant to NEPA regulations (40 C.F.R. 1500-1508), project effects are evaluated based on the criteria of context and intensity. "Context" is defined as the affected environment in which a proposed project occurs. "Intensity" refers to the severity of the effect, which is examined in terms of the type, quality, and sensitivity of the resource involved; location and extent of the effect; duration of the effect (short- or long-term); and other considerations of context. Beneficial effects are also considered. When no measurable effect exists, no impact is found to occur. The intensity of adverse effects is the degree or magnitude of a potential adverse effect, described as negligible, moderate, or substantial. Thus, it is possible that a significant adverse effect may still be the finding under Section 106 of the NHPA even when the intensity of the impact is determined to be negligible. For the purposes of NEPA compliance, the same methods used to identify and evaluate historic properties are applied to aspects of the cultural environment that are not considered NRHP-eligible properties. In compliance with NEPA, evidence or information that suggested both the existence of and impacts to these resources were incorporated into the following analysis.

Cultural resource impact assessment findings presented below are consistent with the NHPA criteria for adverse effect, no adverse effect, or no effect to historic properties (36 C.F.R. Part 800.5). Under these regulations, a project has an effect on a historic property when the project may alter, directly or indirectly, the characteristics of the property that may qualify the property for inclusion in the NRHP [36 C.F.R. Part 800.5(a)]. An effect is considered adverse when the effect on a historic property may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration is given to all qualifying characteristics of a historic property during effects analysis, including those that may have been identified subsequent to the original evaluation of the property's NRHP eligibility. Adverse effects may include reasonably foreseeable effects caused by the project that may occur later in time, be farther removed in distance, or be cumulative.

Adverse effects on historic properties include, but are not limited to:

- Physical destruction of or damage to all or part of the property.
- Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access that is not consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties (36 C.F.R. 68) and applicable guidelines.
- Removal of the property from its historic location.
- Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance.
- Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features.

- Neglect of a property that causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to a Native American tribe or Native Hawaiian organization.
- Transfer, lease, or sale of property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

Impact Analysis under CEQA

The National Register eligibility criteria (36 C.F.R. Section 60.4) was used to evaluate historic significance of resources within the project's area of potential effect (APE), as described in earlier in this chapter, for the purposes of CEQA compliance. Properties that are listed on local agency registers may be considered historical resources for the purposes of CEQA (Cal. Public Res. Code §21084.1), even if they are not found to be eligible for the NRHP. The CRHR criteria of eligibility are based on the NRHP criteria. Once the lead state agency determines a property to be eligible for the NRHP and the CRHR, the potential for the property to be affected by the project must be analyzed.

Based on CEQA guidelines, the project would result in a significant impact on cultural resources if it would result in any of the following:

- Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5.
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5.
- Disturb any human remains, including those interred outside of formal cemeteries.
- If this is the chapter for the SF-SJ EIR/EIS, include the following: *Adoption of AB 52 added Cal. Public Res. Code Section 21084.2, stating that a project with an effect that may cause substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment; this is anticipated to be added to the CEQA guidelines as a revised threshold.*

CEQA guidelines use the following definitions to analyze impacts on historical or archaeological resources:

- Substantial adverse change in the significance of a historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired (Section 15064.5[b][1]).
- The significance of a historical resource would be materially impaired when a project demolishes or materially alters in an adverse manner those physical characteristics that convey its historic significance or justify its inclusion in, or eligibility for, the NRHP, CRHR, or local registers (Section 15064.5[b][2][A–C]).
- This is a placeholder bullet in anticipation that CEQA guidelines may adopt a definition related to tribal cultural resources. The Authority will provide the definition if one is adopted.

3.17.6 Affected Environment

In accordance with PA Attachment C, HSR Program Documentation and Format Guidelines, the methodology for identification of historic properties includes the development of historic themes and contexts. Such contexts characterize the historical environment of the project APE and provide the baseline against which archaeological and historic built resources are evaluated for historic significance and integrity. The following historic contexts and resource typologies are summaries of those included in the Section 106 technical documents. The National Register of Historic Places eligibility criteria (36 C.F.R. Section 60.4) was used to evaluate historic

significance of resources within the project's area of potential effect (APE), as described in earlier in this chapter, for the purposes of NEPA and CEQA compliance.

3.17.6.1 Overview of Archaeological Resources

Prehistoric Archaeological Resources

Provide a brief description of the prehistoric archaeological framework of the project region. Cite the ASR for a more in-depth discussion.

Historic Archaeological Resources

Provide a brief description of the historic archaeological framework of the project region. Cite the ASR for a more in-depth discussion.

Precontact Context

Provide an abbreviated version of the prehistoric and historic context included in the ASR for archaeological resources that are known and predicted within the APE. Cite the ASR for a more in-depth discussion.

Ethnographic Setting

Provide an abbreviated version of the ASR's ethnographic setting within the project region.

Geomorphology of the Project Area

Provide an abbreviated version of the ASR's geomorphology of the project region. Cite the ASR for a more in-depth discussion.

Description of Known Archaeological Sites

Based on the records search, a total of [insert #] previously recorded archaeological sites are within the search radius, which included a radius of XX miles from the centerline of the proposed alignment. Include and complete the following statement, as applicable, if the APE has been delineated. *Of these previously recorded sites, [insert #] are within the archaeological APE (Table 3.17-6); of these sites, [enter #] were evaluated for NRHP and/or CRHR eligibility, [insert #] of which were determined eligible. Surveys conducted on [insert dates] in the [insert name] Project Section field verified the presence of previously determined or listed sites and identified [insert #] additional archaeological resources present within the APE. These sites were evaluated using the NRHP and CRHR significance criteria, and in compliance with the PA (Authority and FRA 2011), and its attachments. Of these evaluated archaeological resources, [insert #] were determined to not be eligible for listing in the NRHP, with SHPO concurrence, and are therefore not addressed in the EIR/EIS. Of the [insert #] remaining resources, [insert #] have been determined to be eligible for the NRHP and CRHR as a result of this study, and received SHPO concurrence on Month/Day/Year.* This section should describe the known prehistoric and historic archaeological resources that have been identified in the APE. This section will be divided into a discussion of resources identified previously and those identified as a result of the project. List each resource in tabular form, by alternative. Please state whether or not SHPO concurrence has been received.

Table 3.17-6. Previously Identified Archaeological Resources in the APE

State Site Identifier (P#)	Resource Name (assigned by recorder)	Period	Description	Significance Determination

[enter notes (do not include term "Notes:")]

If no new sites have been identified, state that and delete the following Table 3.17-7.

Table 3.17-7. Newly Identified Archaeological Resources the APE

State Site Identifier (P#)	Resource Name (assigned by recorder)	Period	Description	Significance Determination

[enter notes (do not include term "Notes:")]

Anticipated Site Types

This section should describe the potential for other site types to be identified in the APE based on background research, field inventory results, and geoarchaeological analyses of the APE.

3.17.6.2 Overview of Historic Built Resources

Historic Built Resources

Historic properties and historical resources are elements of the built environment that are listed in, or eligible for, the NHRP or CRHR, or are considered historical resources for the purposes of CEQA. These elements reflect important aspects of local, state, or national history. They can be buildings, structures, objects, sites (including landscapes), or districts. Examples of the types of historic properties (per NRHP) or historical resources (per CRHR) within the APE include [insert types of listed and eligible properties and resources within the APE].

Historic Context

Provide an abbreviated description of the historic context for those architectural resources known to be within the APE. Cite the HASR, stating that a more in-depth discussion of the area's historic context can be found there.

Types of Historic Built Resources

Provide an abbreviated description of the types of built resources known to be within the APE. Cite the HASR, stating that a more in-depth discussion of the area's property types can be found there.

Description of Historic Built Resources in the APE

The surveys conducted in the [insert name] Project Section identified [insert #] built-environment resources in the APE that were 50 years old or more at the time of the survey conducted in [insert date] and were evaluated using the NRHP and CRHR significance criteria, and in compliance with the PA (Authority and FRA 2011), its attachments, and subsequent guidance. The evaluation of these resources can be found in the Historic Architectural Survey Report (HASR) (Authority and FRA 20[XX]) as required by the Section 106 PA (Authority and FRA 2011). Of these evaluated architectural resources, [insert #] were determined to be ineligible for listing in the NRHP, with SHPO concurrence, and are therefore not addressed in the EIR/EIS. Of the [insert #] remaining resources, [insert #] were listed, [insert #] have been previously determined eligible for listing on the NRHP and CRHR, and [insert #] have been determined to be eligible for the NRHP and CRHR as a result of this study. Previously listed or previously determined eligible properties were field verified to check their current level of historic integrity and document any changes since they were originally recorded. These [insert #] properties are also considered to be historical resources for the purposes of CEQA.

Add the following discussion if there are CEQA only resources.

Additionally, [insert #] resources are ineligible for the NRHP but are listed on the CRHR or officially designated or recognized as historically significant by a local government pursuant to a local ordinance or resolution. Unless the preponderance of the evidence demonstrates that a resource is not historically or culturally significant, such resources are considered historic resources for the purpose of CEQA. As such, these [insert #] properties were also field checked to see if they had been altered subsequent to their designation. Of these [insert #] properties, [insert #] had retained integrity and are considered resources for the purposes of CEQA. These [insert #] historic properties and CEQA resources are listed in Table 3.17-8, and organized by alternative. The table indicates which of the properties or resources are in proximity to which alternative. The [insert #] resources described in the following paragraphs are also described by alternative in the following section.

Describe the known architectural resources present in the APE. Describe in one to two paragraphs each property, including a brief history, a significance statement, and its character-defining features. Then list them in tabular form, by alternative.

Table 3.17-8. Significant Built Resources

Map ID#	APN	Resource Name and Address	City County	NRHP/CRHR Eligibility Criterion

[enter notes (do not include term "Notes:")]

3.17.6.3 Resources of Importance to Native Americans and Other Interested Parties

Describe the results of consultations with the NAHC, Native Americans, and other interested parties regarding the identification of resources of importance to Native Americans and other interested parties.

3.17.7 Environmental Consequences

The Authority has incorporated into the design of the [insert name] Project Section impact avoidance and minimization features (IAMF) that would avoid or minimize impacts on cultural resources (see Volume [insert #], Appendix [insert #], California High-Speed Rail Environmental Commitments—Impact Avoidance and Minimization Features (IAMF)). These IAMFs include avoidance and minimization measures for cultural resources including survey requirements, data recovery plans, avoidance measures, monitoring, and recordation requirements. With respect to cultural resources, the application of IAMFs would minimize or avoid disturbance to archaeological and historic architectural resources and would comply with design standards described in Volume [insert #], Appendix [insert #], Applicable Design Standards.

This section describes the impacts and potential impacts on cultural resources in the [insert name] Project Section alternatives. Because of limited access for archaeological survey during the environmental phase, the identification of archaeological sites will be phased as access to parcels is gained during design-build activities. Therefore all impacts to specific known and yet unknown sites may not be determined at this time. Construction of the [insert name] Project Section alternatives would occur in *both urbanized and rural/undeveloped areas. As with other sections, the [insert name] Project Section alternatives would have the greatest potential to adversely affect historic architectural properties in the urbanized areas, and the greatest potential to affect undisturbed prehistoric archaeological sites in rural/undeveloped areas. The [insert name] Project Section has the potential to affect [insert #] historic architectural resources and [insert #] archaeological resources that are listed or eligible for NRHP. All historic architectural and archaeological resources identified within the [insert name] Project Section APE that were listed or eligible for listing in the NHRP were determined to also be historical resources for the purpose of CEQA. [insert #] CEQA-only resources were identified within the APE.*

3.17.7.1 Archaeological Resources

Activities that effect archeological resources are typically associated with the project construction. If NRHP and CRHR listed or eligible archaeological sites are within the project footprint, construction activities would likely result in adverse effects to those sites, consequently construction impacts cannot be considered as temporary impacts. Soil excavation or compaction resulting from the use of heavy machinery on the construction site itself or in staging areas or any other area of ground-disturbing activities may affect the integrity of artifact-bearing deposits associated with known and as-yet undiscovered archaeological sites. For all alternatives, unknown or unrecorded archaeological resources, including subsurface buried archaeological deposits, may exist. Disturbance and removal of archaeological resources would result in adverse effects on archaeological resources under Section 106 and could cause substantial adverse changes in the significance of an archaeological resource pursuant to California Code of Regulations Section 15064.5 and would be an impact with substantial intensity under NEPA and a significant impact under CEQA.

Describe how archaeological sensitivity is assessed using geoarchaeological studies and other research in order to support a discussion on the sensitivity of each alternative. (Within each alternative in the impacts discussions you will need to discuss any sensitivity differences between the alternatives and how this was determined, such as a geoarchaeological study or a greater access to land within specific alternative APEs.)

Archaeological resources are not typically subject to indirect effects because their settings do not generally contribute to their significance and as a result are not adversely affected by adjacent visual or auditory affects during construction or operation. Exceptions to this are described below under resources of importance to Native Americans and other interested parties.

3.17.7.2 Historic Built Resources

Architectural resources can be both directly and indirectly affected if character-defining features are altered. As with archaeological resources, activities that effect architectural resources are typically associated with the project construction. Activities that can result in adverse effects under Section 106 or substantial adverse changes under CEQA from construction of a project include, but are not limited to, relocation or realignment of resources; demolition, removal of all or portions of buildings, structures, linear features, or landscaping; settlement resulting from adjacent excavation or dewatering; vibration-induced damage; and the alteration of visual character, reducing the feeling and association of the property to its historic setting. Permanent limited access to a historic property can result in its abandonment and eventual demolition. Construction-period alterations to a setting, such as increased noise levels or materials storage, are considered temporary and as such are not considered an adverse effect or a substantial adverse change to historic built resources.

3.17.7.3 Alternative Analysis

Describe the project impacts organized by alternative, and further breakdown the impacts by construction impacts and operational impacts. Further divide these discussions into archaeology, built environment, and other subsections as needed (such as TCPs). If Chapter 2, Alternatives, further breaks down the alternatives by geographic subsections, present the analysis as follows: (1) add tint to rows to group resources by subsection visually, and (2) if the alternatives are not divided into subsections, delete the column “Alternative Subsection.”

If there are no known archaeological sites that will be affected, include the paragraph below for each alternative as applicable. If there are known archaeological sites that will be affected, revise the paragraph below to state that much of the project section alignment could not be surveyed; consequently unknown archaeological resources could be affected. If research and geoarchaeological evidence strongly suggest an alternative or subsections of alternatives are especially sensitive to as yet unidentified subsurface resources, provide a brief description characterizing the sensitivity of that section or subsection.

Although the [insert name] Project Section Alternative 1 will not affect any known archaeological resources, unknown archaeological resources could be affected by all alternatives. This would be an adverse effect under Section 106 of the NHPA and a substantial adverse change in the significance of an archaeological resources pursuant to CEQA Guidelines Section 15064.5 and would therefore be considered a significant impact. Through the implementation of the mitigation, minimization, and avoidance measures presented in Section 3.17.8, such effects may be mitigated or resolved.

No Project Alternative

[insert text as required]

Alternative 1

Construction Impacts

Describe how this alternative will affect archaeological resources for the alternative in general and, if resources are in specific subsections, how those subsections will affect archaeological resources. If this level of specificity would indicate the location of sensitive sites, do not describe in such detail—just include the overall alternative discussion.

Table 3.17-9. Archaeological Resources

Alternative Subsection	State Site Identifier (P#)	Description of Resource	NRHP/CRHR Significance Determination

[enter notes (do not include term "Notes:")]

Describe how this alternative will affect historic built resources for the alternative in general and, if resources are in specific subsections, how those subsections will affect specific built resources.

Table 3.17-10. Built Resources

Alternative Subsection	Map ID#	APN#	Resource Name and Address	City County	NRHP/CRHR Significance Determination	Indirect or Direct Effect

[enter notes (do not include term "Notes:")]

Operations Impacts

Describe how this alternative will affect archaeological resources for the alternative in general and, if resources are in specific subsections, how those subsections will affect archaeological resources. If this level of specificity would indicate the location of sensitive sites, do not describe in such detail—just include the overall alternative discussion.

Table 3.17-11. Archaeological Resources

Alternative Subsection	State Site Identifier (P#)	Description of Resource	NRHP/CRHR Significance Determination

[enter notes (do not include term "Notes:")]

Describe how this alternative will affect historic built resources for the alternative in general. If resources are in specific subsections, how those subsections will affect specific built resources.

Table 3.17-12. Built Resources

Alternative Subsection	Map ID#	APN#	Resource Name and Address	City County	NRHP/CRHR Significance Determination	Indirect or Direct Effect

[enter notes (do not include term "Notes:")]

Add tables for additional alternatives as necessary.

3.17.8 Mitigation Measures

Do not include any mitigation measures that are not applicable to the alternatives in this project section. For the administrative draft, please explain that the following measures may be included in a MOA that will be negotiated between interested parties and executed just prior to the ROD. Also explain that all measures described below may not be included in the executed MOA, and that some measures listed below will be modified in the MOA or associated treatment plans to mitigate adverse effects to specific properties. Do not include this discussion in the public draft or final.

Modify the following italicized paragraphs as needed, and between the administrative draft (prior to getting the MOA drafted) and the final (MOA should be drafted).

In compliance with Section 106, mitigation measures are negotiated in consultation that may include federal, state, and local agencies, Native American tribes, and other interested parties. These measures are then memorialized in a Memorandum of Agreement (MOA); agreed-upon mitigation would be implemented after the MOA is executed. The mitigation measures described below include mitigation measures and commitments that would occur prior to, during, and following construction.

In addition to the mitigation measures below, prior to construction several impact avoidance and minimization measures for archaeology and historic built resources will be implemented (see Chapter 2). These include completion of any remaining pedestrian surveys and inventories; protective measures, such as conducting archaeological sensitivity training; and preserving sites in place where feasible. For built resources, these impact avoidance and minimization measures include the completion of building conditions assessments or historic structures reports, determination of safe construction vibration levels, protection and stabilization plans, and the implementation of the protection and stabilization plans. During construction, impact avoidance and minimization measures include vibration monitoring for built resources, monitoring for

archaeological resources during ground-disturbing activities, and protocols for halting work during construction in the event of a discovery of archaeological resources or damage to built resources.

Pre-construction mitigation measures may include moving historic built resources during construction and protecting them should they not be moved to their permanent location until after construction. Post-construction mitigation measures may include restoration of affected landscape, buildings, or structures to pre-construction condition following the Secretary of the Interior's guidelines for the treatment of historic properties. This includes rehabilitation of properties that suffered unanticipated impacts, to the extent feasible. Mitigation measures that could take place prior to, during, or after construction may include implementation of interpretive programs, including displays, interpretive signage, etc.

Mitigation measures, along with the impact avoidance and minimization measures, will strive to provide the greatest level of protection feasible in light of project costs and logistics, and technological and environmental conditions. Preservation in place through methods such as project redesign of relevant facilities to avoid destruction or damage to eligible cultural resources, capping archaeological resources with fill, or deeding resources into conservation easements is always preferable if these methods are also compatible with project objectives. Extensive documentation of built environment resources that will be moved or demolished, or data recovery of significant archaeological sites where destruction is not avoidable would be at the opposite end of this spectrum.

Under NEPA and Section 106, regulatory requirements exist that must be followed in accordance with the PA. The PA stipulates that a MOA will be prepared for each section of the project to detail the project's commitments to implement these treatments. The MOA for the [insert name] Project Section was developed by the Authority and FRA in consultation with the SHPO, United States Army Corps of Engineers, Surface Transportation Board, and [the consulting parties], and includes input from the signatories and other interested members of the public in the development of treatment measures. The MOA will be executed by the time the ROD is issued for the [insert name] Project Section.

The PA stipulates that two treatments plans be developed: an archaeological treatment plan (ATP) and a built environment treatment plan (BETP). These plans, prepared in consultation with the MOA signatories and concurring parties, provide specific performance standards that make sure that each impact will be avoided, minimized, or mitigated to the extent possible and provide enforceable performance standards to follow the NRHP and the Secretary of Interior's standards when implementing the mitigation measures (Stipulations III and VIII in the PA). These treatment plans will include relevant mitigation measures for the purposes of NEPA and CEQA and implemented in compliance with Section 106; they will be coordinated with the measures included in this EIR/EIS.

Specifically, the ATP will focus on the treatment of known and unknown archaeological resources, and will require the phased identification, evaluation, and mitigation of archaeological resources that may be located on parcels for which legal access has yet to be granted. It will also provide requirements for procedures and protocols to be followed in the event of unanticipated discoveries during construction.

The BETP will describe the treatments to be applied to adversely affected resources in the built environment, as well as protection measures for properties to avoid adverse effects. The treatments and measures included will be specific to each property that will be, or has the potential to be adversely affected by the project.

The treatment plans will be approved and implemented before the start of construction activities that could adversely affect historic properties or historical resources. These requirements will be included in the construction contracts.

3.17.8.1 CUL MM #1: Mitigate Adverse Effects to Archaeological and Built Environment Resources Identified During Phased Identification and Comply with the Stipulations Regarding the Treatment of Archaeological and Historic Built Resources in the PA and MOA

Once parcels are accessible and surveys have been completed, including consultation as stipulated in the Memorandum of Agreement (MOA), additional archaeological and built environment resources may be identified. For newly identified eligible properties that will be adversely affected, the following process will be followed, which is presented in detail in the Built Environment Treatment Plan (BETP) and Archaeological Treatment Plan (ATP):

- The Authority will consult with the MOA signatories and concurring parties to determine the preferred treatment of the properties/resources and appropriate mitigation measures.
- For CRHR-eligible archaeological resources, the Authority shall determine if these resources can feasibly be preserved in place, or if data recovery is necessary. The methods of preservation in place shall be considered in the order of priority provided in CEQA Guidelines § 15126.4(b)(3). If data recovery is the only feasible treatment the Authority shall adopt a data recovery plan as required under CEQA Guidelines § 15126.4(b)(3)(C).
- Should data recovery be necessary, the Contractor's PI, in consultation with the MOA signatories and consulting parties, will prepare a data recovery plan for approval from the Authority/FRA and in consultation with the MOA signatories. Upon approval, the Contractor's PI will implement the plan.
- For archaeological resources the Authority shall also determine if the resource is a unique archaeological site under CEQA. If the resource is not a historical resource but is an archaeological site, the resource shall be treated as required in California Public Resources Code 21083.2 by following protection, data recovery, and other appropriate steps outlined in the ATP. The review and approval requirements for these documents is outlined in the ATP.
- For historic built resources, the Contractor's PI will amend the BETP to include the treatment and mitigation measures identified by the Authority and FRA in consultation with the MOA signatories and concurring parties. The Contractor's PI will implement the treatment and mitigation measures accordingly.

Impacts of Mitigation Measure CUL MM #1

This mitigation measure would apply to the project site (entirely within the project footprint). This mitigation measure would not trigger additional ground-disturbing activities outside of the project footprint and would not change the character or significantly increase the overall amount of construction activity. Therefore, it is anticipated that the impacts of implementing this mitigation measure would be less than significant under NEPA and CEQA.

3.17.8.2 CUL MM #2: Halt Work in the Event of an Archaeological Discovery, and Comply with the PA, MOA, ATP, and all State and Federal Laws, as applicable

During construction (i.e., any ground disturbing activities including cleaning and grubbing) should there be an unanticipated discovery, the Contractor shall follow the procedures for unanticipated discoveries as stipulated in the Programmatic Agreement (PA), Memorandum of Agreement (MOA), and associated Archaeological Treatment Plan (ATP). The procedures must also be consistent with the following: the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716-42), as amended (National Park Service); and Guidelines for the Implementation of CEQA, as amended (Title 14 CCR Chapter 3, Article 9, Sections 15120-15132). Should the discovery include human remains, the Contractor, the Authority, and the FRA shall comply with federal and state regulations and guidelines regarding the treatment of human remains, including relevant sections of Native American Graves Protection and Repatriation Act (NAGPRA) (§3(c)(d)); California Health and Safety Code, Section 8010 et seq.; and Cal. Public Res. Code Section 5097.98; and consult with the Native

American Heritage Commission, tribal groups, and the State Historic Preservation Officer (SHPO).

In the event of an unanticipated archaeological discovery, the Contractor will cease work in the immediate vicinity of the find, based on the direction of the archaeological monitor or the apparent location of cultural resources if no monitor is present. If no qualified archaeologist is present, no work can commence until it is approved by the qualified archaeologist in accordance with the MOA, ATP, and monitoring plan. The Contractor's qualified archaeologist will assess the potential significance of the find and make recommendations for further evaluation and treatment as necessary. These steps may include evaluation for the CRHR and NRHP, and necessary treatment to resolve significant effects if the resource is a historical resource or historic property. If, after documentation is reviewed by the Authority and FRA, and they determine it is a historic property and the SHPO concurs that the resource is eligible for the NRHP, or the Authority determines it is eligible for the CRHR, preservation in place shall be considered by the Authority in the order of priority provided in CEQA Guidelines § 15126.4(b)(3) and in consultation with the signatories and consulting parties to the MOA. If data recovery is the only feasible mitigation, then the Contractor's qualified Principal Investigator (PI) shall prepare a data recovery plan as required under CEQA Guidelines § 15126.4(b)(3)(C), the MOA, and ATP, for the Authority's approval.

The Contractor shall notify the Authority, who shall notify the California State Lands Commission (CSLC), if the find is a cultural resource on or in the submerged lands of California and consequently under the jurisdiction of the CSLC. The Authority will comply with all applicable rules and regulations promulgated by CSLC with respect to cultural resources in submerged lands.

If human remains are discovered on state-owned or private lands the Contractor shall contact the relevant County Coroner to allow the Coroner to determine if an investigation regarding the cause of death is required. If no investigation is required and the remains are of Native American origin the Authority shall contact the Native American Heritage Commission to identify the most likely descendant (MLD). The MLD shall be empowered to reinter the remains with appropriate dignity. If the MLD fails to make a recommendation the remains shall be reinterred in a location not subject to further disturbance and the location shall be recorded with the Native American Heritage Commission and relevant Information Center of the California Historical Resources Information System.

If human remains are part of an archaeological site, the Authority and Contractor shall, in consultation with the MLD and other consulting parties, consider preservation in place as the first option, in the order of priority called for in CEQA Guidelines Section 15126.4(b)(3).

In consultation with the relevant Native American Tribes, the Authority may conduct scientific analysis on the human remains if called for under a data recovery plan and amenable to all consulting parties. The Authority will work with the MLD to satisfy the requirements of California Public Resources Code Section 5097.98. Performance tracking of this mitigation measure will be based on successful implementation and acceptance of the documentation by the SHPO and appropriate consulting parties.

Impacts of Mitigation Measure CUL MM #2

No ground disturbing activities or property acquisition would be necessary to comply with this mitigation measure if the site can be preserved in place. In this case, there would be no impacts on other resources as a result of implementing this mitigation measure. If intentional burial is required, the new burial site will be selected in consultation with the most likely descendant, and surveyed by qualified archaeologists prior to excavation. A site will be selected that would not result in impacts to any other resource types, such as biological. Therefore, it is anticipated that the impacts of implementing this mitigation, should intentional burial be necessary, would be less than significant under NEPA and CEQA.

3.17.8.3 CUL MM #3: Other Mitigation for Effects to Pre-Contact Archaeological Sites

Due to limited access to private properties during the environmental review phase of this project, the FRA's and Authority's ability to fully identify and evaluate archaeological resources within the APE has, correspondingly, also been limited. Thus, the majority of the project APE has not been subject to archaeological field inventories. As pedestrian field surveys are a necessary component of the archaeological resource identification and evaluation effort, the commitment to complete the field surveys, prior to ground disturbing activities associated with the project, is codified in the MOA that has been executed as a condition of this Final EIR/EIS.

Access to previously-inaccessible properties to complete the archaeological resource identification effort is expected to be available after the Record of Decision, during the design-build phase of the project. However, due to the design constraints associated with constructing a high-speed train, the ability to shift the alignment to avoid any newly-identified archaeological resources at this late phase of the project delivery process is substantially limited or unlikely, as the alignment is already established. As such, impacts/effects to as-yet-unidentified significant archaeological resources as a result of this project are anticipated; however, the nature and quantity of such effects remains unknown until completion of the archaeological field identification and evaluation effort, and after all ground-disturbing construction activities are complete.

Protocols for the identification, evaluation, treatment, and data-recovery mitigation of as-yet-unidentified archaeological resources are addressed in the MOA and ATP. Efforts to develop meaningful mitigation measures for effects to as-yet-unidentified Native American archaeological resources that cannot be avoided will be negotiated with the tribal Consulting Parties. Measures that are negotiated among the MOA signatories and tribal Consulting Parties will be the responsibility of the Authority to implement.

Impacts of Mitigation Measure CUL MM #3

If intentional burial is required, the new burial site will be selected that would not result in impacts to any other resource types, such as biological. Therefore, it is anticipated that the impacts of implementing this part of this mitigation measure, should intentional burial be necessary, would be less than significant under NEPA and CEQA. Should sites be procured for plant gathering or ceremonial activities, or if a cultural center is developed, locations will be selected that will not impact other resource types. Educational programs, internships, and curation are examples of mitigation measures that do not result in ground disturbing activities or property acquisition. Therefore, there would be no impacts on other resources as a result of implementing these aspects of this mitigation measure.

3.17.8.4 CUL MM #4: Minimize Adverse Effects through Relocation of Historic Buildings and Structures

The Authority-prepared Memorandum of Agreement (MOA) and Built Environment Treatment Plan (BETP) may identify historic properties/historical resources for relocation to avoid their destruction and minimize direct adverse effects resulting from physical damage or alteration. The development of plans for relocation and the implementation of relocation will take place before construction is undertaken within 1,000 feet of the properties. The relocation of the historic properties/historical resources will be specified in the BETP by the Authority or the Contractor's Principal Investigator (PI), depending on when the location is identified, and take into account the historic site and layout (i.e., the orientation of the building(s) to the cardinal directions), and their potential re-use. The Contractor's qualified architectural historian, along with an interdisciplinary team of professionals as appropriate, will prepare a relocation plan that will provide for protection and stabilization of the buildings or structures before, during, and after the move, as well as measures to address inadvertent damage. The plan will be subject to review and approval by the Authority/FRA, in consultation with the MOA signatories and concurring parties. The relocation

will be implemented according to the plan. As the design progresses, additional properties may be determined by the Authority as requiring this mitigation.

Impacts of Mitigation Measure CUL MM #4

Should any buildings have to be moved, the location will be selected that will ensure no other resources will be impacted. Therefore, other than the impacts to the moved buildings or structures, there would be no impacts to other resources as a result implementing this mitigation measure. Under NEPA, moving a historic building or structure to an appropriate location would be considered to be mitigated to a less than substantial adverse effect; under CEQA, moving a historical building or structure to avoid demolition is considered mitigation that would result in a less than significant impact.

3.17.8.5 CUL MM #5: Minimize Adverse Operational Noise Effects

The Authority-prepared Memorandum of Agreement (MOA) and Built Environment Treatment Plan (BETP) will identify the historic properties/historical resources that will be subject to treatment to minimize the indirect adverse effects caused by the operational noise of the HSR. The manner in which each property that is subject to this mitigation will be treated will be developed in consultation with the landowner or land-owning agencies and the Authority, and specified in the BETP. The Contractor is responsible for the planning and implementation of the noise abatement mitigation identified in the BETP. All plans will be approved by the Authority/FRA in consultation with the MOA signatories prior to their implementation. Should a noise wall be selected as mitigation, the Contractor shall evaluate additional effects to the historic property. If the Authority/FRA finds the effects to be adverse in consultation with the MOA signatories and concurring parties, the Authority/FRA will develop additional mitigation measures in consultation with the signatories of the MOA. If additional effects are determined to be adverse, mitigation measures will be determined in consultation with the SHPO and MOA signatories and concurring parties and carried out by the Contractor. As the design progresses, additional properties may be determined by the Authority as requiring this mitigation.

Impacts of Mitigation Measure CUL MM #5

Any alterations to historic properties/historical resources will follow the Secretary of the Interior's guidelines, and therefore result in less than significant impacts. Should the measure require a sound wall, the visual effects of the sound wall will be analyzed to determine if its construction would result in an adverse visual effect that might be greater than the introduction of operational noise, based on effects to the property's character-defining features. If a sound wall is determined to be the appropriate mitigation, the location will be selected that will ensure no other resources will be impacted. Therefore, there would be no impacts to other resources as a result implementing this mitigation measure. Other than the potential indirect effects on the sensitive noise receptor by adding a sound wall, this mitigation would result in a less than significant impact.

3.17.8.6 CUL MM #6: Prepare and Submit Additional Recordation and Documentation

The Authority-prepared MOA and BETP will identify specific historical resources that would be physically altered, damaged, relocated, or destroyed by the project and require documentation. This documentation may consist of preparation of updated recordation forms (DPR 523), or may be consistent with the Historic American Building Survey (HABS), the Historic American Engineering Record (HAER), or the Historic American Landscape Survey (HALS) programs; a Historic Structure Report; or other recordation methods stipulated in the MOA and described in the BETP. The specific mitigation for each property will be determined in consultation with the MOA signatories and concurring parties. The BETP will detail the appropriate type and level of recordation for each property. The recordation undertaken by this treatment would focus on the aspect of integrity that would be affected by the project for each historic property subject to this treatment. For example, historic properties in an urban setting that would experience an adverse visual effect would be photographed to capture exterior and contextual views; interior spaces

would not be subject to recordation if they would not be affected. The appropriate method of documentation will be specified in the BETP for each property, resulting from consultation with the SHPO, MOA signatories and concurring parties. Such documentation will follow the appropriate guidance for the recordation format and program selected.

Copies of the documentation will be provided to the consulting parties and offered to the appropriate local governments, historical societies and agencies, or other public repositories, such as libraries, as specified in the BETP. The documentation will also be offered in printed and electronic form to any repository or organization to which the SHPO, the Authority, and the local agency with jurisdiction over the property, through consultation, may agree. The electronic copy of the documentation may also be placed on an agency or organization's website.

As the design progresses, additional properties may be determined by the Authority as requiring documentation.

In general, photography should capture views of the historic property from multiple vantage points, and could include reproduction of historic images, and architectural or engineering drawings as well. All fieldwork necessary for photographic documentation, architectural or engineering drawings, and digital recordation through geographic information or global positioning systems (GIS and GPS, respectively) shall be completed by the Contractor and approved by the Authority and SHPO before project construction begins. The written data will include a narrative for the historic property that will utilize existing inventory, evaluation, and nomination documents to the extent possible.

This kind of documentation will require the Contractor to engage an interdisciplinary team to adequately complete this mitigation. The team will likely be required to include, at a minimum, an architectural historian or a historian, and a photographer. Other team members may include a landscape architect or CADD technician. The Built Environment Treatment Plan (BETP) shall detail the required personnel and qualification standards for these preparers. The Authority shall submit the documentation to the SHPO for review and comment. If the documentation is to follow the HABS/HAER/HALS program, consultation by the Authority with National Park Service (NPS) will be required. The final documentation will be prepared by the Contractor's qualified team, be approved by NPS, and submitted to the Library of Congress by the Authority. The BETP shall identify the distribution of printed and electronic copies of the photo documentation, as well as permanent archival disposition of the record, if applicable.

Impacts of Mitigation Measure CUL MM #6

No ground disturbing activities or property acquisition would be necessary to comply with this mitigation measure. Therefore, there would be no impacts on other resources as a result of implementing this mitigation measure.

3.17.8.7 CUL MM #7: Prepare Interpretive or Educational Materials

The Authority-prepared MOA and BETP will identify historic properties and historical resources that will be subject to historic interpretation or preparation of educational materials. Interpretive and educational materials will address the significance of the properties that would be affected by the project. Interpretive or educational materials could include, but are not limited to: brochures, videos, websites, study guides, teaching guides, articles or reports for general publication, commemorative plaques, or exhibits. The agreed-upon method of interpretation will be specified in the BETP for each property, resulting from consultation with the SHPO, MOA signatories and concurring parties. The Contractor will be responsible for assembling the appropriate interdisciplinary team to fulfill this mitigation. The required professionals and their qualifications will be specified in the BETP.

In the preparation of the interpretive or educational materials, the Contractor's team will utilize previous research included in the environmental technical documents, images, narrative history, drawings, or other material produced for the mitigation described above. The interpretive or educational materials will be made available to the public in physical or digital formats, at local libraries, historical societies, or public buildings, as specified in the BETP.

Impacts of Mitigation Measure CUL MM #7

No ground disturbing activities or property acquisition would be necessary to comply with this mitigation measure. Therefore, there would be no impacts on other resources as a result of implementing this mitigation measure.

3.17.8.8 CUL MM #8: Repair of Inadvertent Damage

The Authority-prepared Memorandum of Agreement (MOA) and Built Environment Treatment Plan (BETP) will identify properties subject to the preparation of plans for the repair of inadvertent damage, and plans to be developed prior to the start of construction in the immediate proximity of the historic properties; the HSR standard impact avoidance and minimization measures require the Contractor to prepare these plans. Should any of the properties or resources be damaged as a result of construction activities, the Contractor will repair them in accordance with the approved plan and with the Secretary of the Interior's (SOI) Standards for Rehabilitation. Inadvertent damage is any damage that results in a significant impact to a historical resource within the meaning of CEQA Guidelines Section 15064.5(b)(2) or adverse effects to historic properties within the meaning of 36 C.F.R. Part 800.5(a)(1). All repairs will be reviewed and approved by the Authority prior to determining that the treatment has been adequately implemented.

There may be instances where a property or resource that is damaged during construction will be better served by temporary stabilization and protection, with final repairs occurring post construction. This will be determined by the Authority, in consultation with the MOA signatories. Should this be the preferred approach, the Contractor will have their interdisciplinary team prepare plans for the temporary work, for approval by the Authority and MOA signatories prior to construction commencing in the area of the damaged property. Any emergency stabilization deemed necessary by the Contractor prior to plan approval must be reversible.

Impacts of Mitigation Measure CUL MM #8

No ground disturbing activities or property acquisition would be necessary to comply with this mitigation measure. Therefore, there would be no impacts on other resources as a result of implementing this mitigation measure.

3.17.8.9 CUL MM #9: Visual Screening

The Authority-prepared Memorandum of Agreement (MOA) and Built Environment Treatment Plan (BETP) will identify historic properties and historical resources that will be subject to visual screening. Visual screening will be installed by the Contractor and consist of plant material that will minimize the view of the project from the property subject to mitigation. This treatment will minimize adverse effects on historic properties/historical resources.

Plant species will be selected by the Contractor's interdisciplinary team of architectural historians and landscape architects on the basis of species' mature size and shape, growth rate, appropriateness to the historic property, fire resistance, and drought tolerance. The design and recommended plant make-up of the screen will be reviewed and approved by the Authority/FRA in consultation with the MOA signatories and land owner or land-owning agency. No species that are listed on the Invasive Species Council of California's list of invasive species will be planted. The Contractor will arrange to have the landscaping continuously maintained for a period specified in the plan and appropriate irrigation systems will be installed if the landscape architect determines it is needed. The plan will define the terms of replacement should the plants die.

Impacts of Mitigation Measure CUL MM #9

Any alterations to historic properties/historical resources will follow the Secretary of the Interior's guidelines, and therefore result in less than significant impacts. Should a property require visual screening, the visual effects will be analyzed to determine if its planting would result in an adverse visual effect that might be greater than the introduction of the project visual impacts, based on effects to the property's character-defining features. If a plant screen is determined to be the appropriate mitigation, the location will be selected that will ensure no other resources will be impacted. Therefore, there would be no impacts to other resources as a result implementing

this mitigation measure. Other than the potential indirect effects on the resource by adding a planting screen, this mitigation would result in a less than significant impact.

3.17.8.10 CUL MM #10: Station Design Consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties

Several HSR stations will be constructed adjacent to or on the site of National Register of Historic Places/California Register of Historical Resources -listed or -eligible railroad stations, within historic districts, or in close proximity to other historic properties. At the time of the record of decision (ROD) for each project section, the station locations are identified; station design will be prepared post ROD. The Authority will be issuing requests for qualifications (RFQ) to receive statements of qualifications (SOQ) from qualified firms (Contractor) for station designs and related services. Such firms will be contracted to provide professional consultant and design services for all design stages through final design. Selected firms will be responsible for ensuring their designs are context sensitive and meet the Secretary of the Interior's Standards (SOIS) for the treatment of historic properties. Stations that require this mitigation measure will be identified in the Section 106 Memoranda of Agreement (MOA) and Built Environment Treatment Plans (BETP) for each project section, as appropriate. The consultation roles of MOA signatories and interested parties in the design of the stations will also be specified in the MOAs and BETPs. At a minimum, the Authority/RDP professionally qualified architectural historians and the SHPO will be given the opportunity to review and comment on the designs.

If the proposed location is on the site of or adjacent to historic properties, the Contractor at a minimum will be required to include on their team a professionally qualified architectural historian, and may also be required to include a historical architect, a landscape architect with experience related to historic properties, an archaeologist, or other historic preservation professionals. The selected professionals' qualifications will be reviewed and approved by the Authority/RDP professionally qualified staff.

The Authority will require the Contractor to provide three schemes for Authority review, including an evaluation of each scheme. The deliverables will also include drawings, such as plans, elevations, and renderings. The Contractor will be required to include in each evaluation a historic property design compatibility report prepared by a qualified architectural historian describing how the scheme is consistent with the SOI's Standards for Rehabilitation for infill designs or additions, and if any restoration or rehabilitation will be required of the historic buildings and structures and how such restoration is consistent with the SOI's Standards for Restoration. The report will reference applicable National Park Service Preservation Briefs, such as #14 New Exterior Additions to Historic Buildings, and discuss size, scale, and massing of the proposed project and how it will be differentiated from the historic property. It will also include application of the criteria of adverse effect (36 CFR § 800.5) to each proposed scheme, considering both direct and indirect effects to historic properties, to ensure that the selected design will not adversely affect historic properties. For the purposes of evaluating effects to historic properties, the Contractor may be required to produce renderings that include adjacent properties. The report will be reviewed and commented upon by Authority/RDP professionally qualified staff and may require revision prior to transmitting it to the SHPO and other MOA signatories and consulting parties, as specified in the MOA and BETP.

Impacts of Mitigation Measure CUL MM #10

No ground disturbing activities or property acquisition would be necessary to comply with this mitigation measure. Therefore, there would be no impacts on other resources as a result of implementing this mitigation measure.

3.17.9 Impact Summary for Comparison of Alternatives

Summarize the NEPA Impacts and CEQA Significance Conclusions of each alternative using the format identified in the Environmental Methodology Guidelines, while further dividing the conclusions into archaeology and built environment subsections.

3.17.9.1 NEPA Impacts

Under the No Project Alternative, growth and development would continue and the resulting direct and indirect impacts on cultural resources would still occur. Development activities and ongoing infrastructure maintenance, such as continued operation of existing roads, highways, utilities, airports, and railways, would continue to result in impacts including construction-related disturbance to unknown archaeological sites, increased public access leading to site disturbance, and possible impacts to historic built resources.

Table 3.17-13 provides a comparison of the potential impacts of implementing the [insert name] Project Section alternatives on cultural resources. Data from this table and information in this summary are described in detail in Section 3.17.7, Environmental Consequences.

Summarize the known archaeological sites that will be affected and how the different alternatives vary in their level of impact. Discuss the application of mitigation measures to the impacts and significance of impacts during construction. Explain why impacts to archaeological sites will likely occur only during construction. If there are no known archaeological sites in any alternative, please state it here. This subsection must facilitate drafting of the summary of potential effects in the ROD. It should contain a high-level summary of NEPA impacts and conclusions. The NEPA impact summary discussion and conclusion take mitigation measures into account and identify only those impacts that remain significant after mitigation (there is no need to include impacts that are not significant here). Under NEPA an effect is not significant until after mitigation is applied and it remains significant. This is different than CEQA and a key differentiator here.

Include the following discussion regarding properties that were inaccessible during the environmental phase that will undergo phased identification.

Because of limited access to private lands in the APE for all alternatives, it is possible that as-yet-unknown NRHP-eligible archaeological sites could be identified within the APE as part of the Section 106 phased historic properties identification effort that would be conducted when property access becomes available, prior to ground-disturbing activities. If such sites are identified and cannot be avoided, significant impacts on archaeological properties could occur. All alternatives also have the potential to damage previously unidentified archaeological sites that may not be identified through survey prior to construction. While cultural resource inventories will be completed once legal access is secured, no inventory can ensure that all resources are identified. Because these sites may be historic properties, damage to these sites may diminish their integrity. Additionally, given the nature of the HSR Project and the design requirements, an established alignment may not be able to be altered to avoid archaeological sites discovered by the time property access is granted. For these reasons the impact of all alternatives could be adverse.

However, the impact avoidance and minimization features (IAMF) and mitigation measures (MM) will lessen the potential for ground disturbance-related impacts to [known and] as-yet undiscovered archaeological sites to occur before and during construction. The IAMFs are intended to reduce impacts during pre-construction and include:

- **CUL-IAMF#1** requires a geospatial layer of any archaeological sites be added to construction drawings;
- **CUL-IAMF#2** requires construction personnel to attend a worker environmental awareness program (WEAP) training session to be able to recognize potential cultural resources and to follow the appropriate procedures should a discovery be made during construction;
- **CUL-IAMF#3** requires completion of archaeological surveys prior to any ground-disturbing activities;
- **CUL-IAMF#4** allows for the relocation of laydown sites if archaeological sites are discovered during survey; and
- **CUL-IAMF#5** requires the preparation of an archaeological monitoring plan.

Mitigation Measures developed to reduce impacts prior to construction include:

- **CUL-MM#1** mitigation of adverse effects to properties identified during phased identification.

During construction:

- **CUL-MM#2** requires that work be halted in the event of an archaeological discovery.

These measures will reduce the potential for impacts on archaeological resources should they be [known or] discovered before or during construction activities.

Surveys identified [insert #] historic built listed and eligible-for-listing properties within the APE. List them here if less than four. If more than three, list as bullet points. Summarize the historic built resources that will be impacted and how the different alternatives vary in their level of impact. Discuss the application of mitigation measures to the impacts and significance of impacts during construction. This subsection must also facilitate drafting of the summary of potential effects in the ROD. It should contain a high-level summary of NEPA impacts and conclusions. The NEPA impact summary discussion and conclusion take mitigation measures into account and identify only those impacts that remain significant after mitigation (there is no need to include impacts that are not significant here). Under NEPA an effect is not significant until after mitigation is applied and it remains significant. This is different than the requirements under CEQA and a key differentiator here.

If there were inaccessible built resources, include the following:

If any additional historic architectural resources are identified in the APE in the course of the surveys on as-yet inaccessible land outlined in **CUL-IAMF#3, CUL-IAMF#6, and CUL-MM#5** will be applied. **CUL-IAMF#6** requires a Plan for the Protection of Historic Built Resources and Repair of Inadvertent Damage be prepared and implemented prior to construction, and **CUL-MM#5** requires the recordation and documentation of historic properties as agreed upon by the MOA signatories and consulting parties. Furthermore, **CUL-IAMF#7** requires a Built Environment Monitoring Plan be prepared by the Contractor prior to construction.

If more than three alternatives are included, expand the table below.

Table 3.17-13 NEPA Comparison of Project Section Alternative Effects on Historic Properties

	Alternatives		
	1	2	3
Construction Impacts			
Archaeological Properties			
Identify resource to be affected, describe the effect and the mitigation measure(s) identified to reduce the effect, how the mitigation measure reduces the effect, and if the effect is significant or not significant after mitigation	[significant/not significant]	[significant/not significant]	[significant/not significant]
Repeat as needed	[significant/not significant]	[significant/not significant]	[significant/not significant]
Architectural Properties			
Identify resource to be affected, describe the effect and the mitigation measure(s) identified to reduce the effect, how the mitigation measure reduces the effect and if the effect is significant or not significant after mitigation.	[significant/not significant]	[significant/not significant]	[significant/not significant]
Repeat as needed	[significant/not significant]	[significant/not significant]	[significant/not significant]
Operations Impacts			
Archaeological Properties			
Identify resource to be affected, describe the effect and the mitigation measure(s) identified to reduce the effect, how the mitigation measure reduces the effect and if the effect is significant or not significant after mitigation.	[significant/not significant]	[significant/not significant]	[significant/not significant]
Repeat as needed	[significant/not significant]	[significant/not significant]	[significant/not significant]
Architectural Properties			
Identify resource to be affected, describe the effect and the mitigation measure(s) identified to reduce the effect, how the mitigation measure reduces the effect and if the effect is significant or not significant after mitigation.	[significant/not significant]	[significant/not significant]	[significant/not significant]
Repeat as needed	[significant/not significant]	[significant/not significant]	[significant/not significant]

[enter notes (do not include term "Notes:")]

3.17.9.2 CEQA Significance Conclusions

Present the CEQA conclusion narrative associated with the project alternatives under the subheadings of construction impacts and operations impacts. Please clearly describe all facts, analyze the facts and apply the thresholds, and reach a clear conclusion about the impacts prior to discussing mitigation. Discuss the application of mitigation measures and IAMFs to the impacts and significance of impacts during construction and operations periods (see NEPA discussion above). Reach a clear conclusion about the impact WITH mitigation and explain any secondary impacts of implementing mitigation. Describe clearly and succinctly how the different alternatives vary in their level of impact. This subsection must facilitate drafting of the CEQA Findings of Fact and should therefore contain a high-level summary of CEQA impacts and conclusions.

To summarize the above discussion, present a table of CEQA impacts for each project alternative, grouping impacts by construction and operations. Use maps, as appropriate, to show locations of built historic resources.

Include the following discussion regarding phased identification in areas inaccessible during the environmental phase.

Because of limited access to private lands within the APE for all alternatives, it is possible that as-yet-unknown archaeological sites qualifying as historical resources or unique archaeological resources could be identified within the APE as part of the phased historic properties identification effort that would be conducted when property access becomes available, prior to ground-disturbing activities. If such resources are identified and cannot be avoided, significant and unavoidable impacts on such archaeological sites could occur. All alternatives also have the potential to damage previously unidentified archaeological sites that may not be identified through survey prior to construction. While cultural resource inventories will be completed once legal access is secured, no inventory can ensure that all resources are identified. Damage to these resources may disrupt the spatial associations that contain scientifically useful information and therefore alter their potential basis for eligibility. Additionally, given the nature of the HSR Project and the design requirements, an established alignment may not be able to be altered to avoid historical resources or unique archaeological resources discovered by the time property access is granted. For these reasons the impact of all alternatives could remain significant and unavoidable.

Add tables as needed for each alternative. The intent of the table is not as a substitute to a robust and clear analysis, but to summarize the conclusions for the reader.

Table 3.17-14. CEQA Significance Conclusions

Impact	CEQA Level of Significance before Mitigation	Mitigation Measures	CEQA Level of Significance after Mitigation
Construction			
Archaeological Impacts			
Historic Architectural Impacts			
Operations			
Archaeological Impacts			
Historic Architectural Impacts			

3.17.10 Products

The HSR regional consultant (RC) or engineering and environmental consultant (EEC) is responsible for preparing the following products, under Authority and FRA direction, according to Rail Delivery Partner (RDP) guidance and subject to RDP quality control and assurance.

3.17.10.1 Technical Report or Appendix

In addition to the Volume 1 impacts analysis chapter, provide technical reports and Volume 2 appendices where full analysis applicable to the HSR Project Section requires details in excess of efficient inclusion in the EIR/EIS Volume 1 chapter. For example:

1. Volume 2, Appendix 2-E, Project Impact Avoidance and Minimization Features Analysis
2. Volume 2, Appendix 3.17-A, Programmatic Agreement
3. Volume 2, Appendix 3.17-B Regional and Local Policy Inventory
4. Archaeological Survey Report (ASR) (redacted)
5. Historic Architectural Survey Report (HASR)
6. Finding of Effect Report (FOE)
7. Memorandum of Agreement Document (MOA)
8. Historic Property Treatment Plans

Compile the technical reports listed above so that they comply with the Section 106 process and are prepared in accordance with the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (Standards and Guidelines) (48 C.F.R. Parts 44716 to 44742) and 36 C.F.R. Part 800.4. The content and format of each technical report is outlined in Attachment C, HSR Program Documentation and Format Guidelines, of the PA. In addition, prepare appropriate maps, figures, database, and DPR 523 forms to help illustrate the survey

data results and understand the extent and relevance of the Project to historic properties, as stipulated in the PA.

3.17.10.2 Project EIR/EIS Volume 1

1. Summary/Table for EIR/EIS Executive Summary
2. Project Description—Cultural Resources-related Components
    a. Impact Avoidance and Minimization Features
    b. Summary Table of Impact Avoidance and Minimization Features, and Project Impacts Program Operation Features
3. Affected Environment, Environmental Consequences and Mitigation Measures Section: Cultural Resources
4. Affected Environment, Environmental Consequences and Mitigation Measures Section: Cumulative Impacts
5. Mitigation Monitoring and Reporting Program

3.17.11 Cultural Resources EIR/EIS Outline

The RC shall use the following outline for organizing content related to Cultural Resources in Chapter 3 of the Project EIR/EIS, using the heading hierarchy and format as indicated. The RC shall consider the impacts of implementing mitigation measures in Section 3.17.8.

3.17 Cultural Resources
- 3.17.1 Introduction
- 3.17.2 Laws, Regulations, and Orders
    - 3.17.2.1 Federal
    - 3.17.2.2 State
    - 3.17.2.3 Regional and Local
- 3.17.3 Regional and Local Policy Analysis
- 3.17.4 Coordination of Section 106 Process with NEPA and CEQA Compliance
    - 3.17.4.1 Section 106 Technical studies Prepared for the Project
    - 3.17.4.2 Agency, Native American, Interested Parties, and Public Outreach Efforts
        - Agency and Interested Party Outreach
        - Native American Outreach and Consultation
        - Consulting Parties
- 3.17.5 Methods for Evaluating Impacts
    - 3.17.5.1 Definition of Resource Study Areas
        - Archaeological APE
        - Historic Built Resources APE
        - Cultural Resources Data Sources
    - 3.17.5.2 Methods for Resource Identification
        - Archaeology Methods
        - Historic Architectural/Built Resources Methods
        - Consideration of the Presence of Traditional Cultural Properties
        - Methods for Identifying Resources of Importance to Native Americans and Other Interested Parties
    - 3.17.5.3 Methodology for Impact Analysis
        - Impact Analysis under NEPA
        - Impact Analysis under CEQA
- 3.17.6 Affected Environment
    - 3.17.6.1 Overview of Archaeological Resources
        - Prehistoric Archaeological Resources
        - Historic Archaeological Resources
            - Prehistoric Context

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3.18 Regional Growth

The methodology guidelines in this section are organized by a sequence of steps for preparing the analysis of potential regional growth impacts. Section 3.18.9 provides an outline for this environmental impact report/environmental impact statement (EIR/EIS) section.

Section 3.0, General Methodology Guidance for Resource Sections, provides the methodological framework common to the evaluation of all resource areas. Use Section 3.0 in combination with this Regional Growth guidance when developing the EIR/EIS analyses.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate. Example text that illustrates the concepts and methods is shown in *italics*. The major sections in the methods are organized to mirror the organization of the EIR/EIS section and use the same format scheme for headings, text, and tables as the EIR/EIS.

If there is a discrepancy between the material in this guidance and any adopted federal or state agency guideline or manual applicable to regional growth, use the methods identified in the agency guideline or manual. Identify and discuss any discrepancy with the California High-Speed Rail Authority (Authority), Federal Railroad Administration (FRA), and the Rail Delivery Partner (RDP) before deviating from this guidance.

3.18.1 Introduction

The general method for preparing an introduction for this EIR/EIS section is provided in Section 3.0.1, Introduction. The following discussion presents direction for Regional Growth.

Refer specifically to related content in other sections of the EIR/EIS that influence or are influenced by the Regional Growth impact analysis (socioeconomics and communities, environmental justice, cumulative) and supportive/associated technical documents with citations, e.g., Community Impact Assessment. References to other sections of the EIR/EIS must include the specific section number (by lowest heading tier (e.g., 3.X.X)), not just a general reference to a Chapter or section in the EIR/EIS.

3.18.2 Laws, Regulations, and Orders

Federal, state, regional, and local laws, regulations, orders, or plans germane to regional growth in the geographic area that is affected by the California High-Speed Rail (HSR) project are presented in this section. General National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA) requirements for assessment and disclosure of environmental impacts are described in Section 3.1, Introduction. The following NEPA and CEQA requirements are specifically applicable to the evaluation of Regional Growth.

3.18.2.1 Federal

NEPA Requirements to Analyze Growth

The Council on Environmental Quality (CEQ) regulations, which implement the National Environmental Policy Act of 1969 (as amended) (NEPA), require evaluation of the potential environmental consequences of all proposed federal activities and programs. This provision includes a requirement to examine both direct and indirect consequences that may occur in areas beyond the immediate influence of an action alternative and at some time in the future. Positive and negative growth (i.e., change) is a potential consequence of the high-speed rail (HSR) alternatives. Direct growth effects are those caused by any HSR alternative, occurring at the same time and place (40 C.F.R. 1508.08). Direct growth effects include any permanent jobs directly associated with the HSR alternatives as well as any displacement of housing related to the construction and operation of the proposed rail facilities. Indirect growth effects are considered to be reasonably foreseeable effects caused by the HSR alternatives, typically occurring later in time or farther in distance from the project (40 C.F.R. 1502.15(b) and 1508(b)). These include positive or negative growth in population numbers or patterns, positive or negative growth in local or regional economic vitality, and associated alterations in land use patterns that

could occur with implementation of the HSR project. Removal of existing obstacles to growth would also be considered indirect growth effects. "Removal of obstacles to growth" would include the extension of public services and utilities to a previously undeveloped area where the provision of such services could cause a foreseeable increase in population or economic growth.

3.18.2.2 State

CEQA Requirements to Analyze Growth

CEQA Guidelines (Cal. Code Regs., tit. 14, §§ 15000–15387) Section 15126.2(d) requires an EIR to evaluate the potential growth-inducing impacts of a proposed project. An EIR must discuss the ways in which the project could foster economic or population growth or the construction of additional housing, either directly or indirectly, in the surrounding environment. A project that removes an obstacle to growth, for example, would have an indirect growth-inducing effect, whereas a project that would construct new housing would have a direct growth-inducing effect. The CEQA Guidelines emphasize that "it must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment."

Sustainable Communities and Climate Protection Act of 2008 (SB 375)

The Sustainable Communities and Climate Protection Act of 2008 requires California's 18 metropolitan planning organizations (MPO) to adopt a sustainable communities strategy (SCS) or alternative planning strategy (APS) as part of their regional transportation plans. The purpose of the SCS or APS is to reduce greenhouse gas emissions from automobiles and light trucks within each region to meet emissions targets set by the California Air Resources Board.

Identify the emissions targets for the HSR section region. Briefly outline the commitments of the region, key MPOs involved, relevant documents or plans, and dates set for implementation.

Pursuant to California Government Code 65080(b)(2)(B), the SCS or APS shall:

(i) Identify the general location of uses, residential densities, and building intensities within the region

(ii) Identify areas within the region sufficient to house all the population of the region, including all economic segments of the population, over the course of the planning period of the regional transportation plan, taking into account net migration into the region, population growth, household formation, and employment growth.

(iii) Identify areas within the region sufficient to house an 8-year projection of the regional housing need for the region pursuant to section 65584.

(iv) Identify a transportation network to service the transportation needs of the region.

(v) Gather and consider the best practically available scientific information regarding resource areas and farmland in the region, as defined in subdivisions (a) and (b) of section 65080.01.

(vi) Consider the state housing goals specified in sections 65580 and 65581.

(vii) Set forth a forecasted development pattern for the region, which, when integrated with the transportation network, and other transportation measures and policies, will reduce the greenhouse gas emissions from automobiles and light trucks to achieve, if feasible, the greenhouse gas emission reduction targets approved by the state board.

(viii) Allow the regional transportation plan to comply with section 176 of the federal Clean Air Act (42 U.S.C. § 7506).

The regional transportation plan adopted by each of the [MPO names] MPOs identifies the region's transportation needs, including specific projects to meet those needs, and establishes the basis for distributing federal, state, and local funding to implement those projects. SB 375 is

intended to require the MPOs to direct transportation funding toward investments that would reduce greenhouse gas emissions and away from investments that would not.

SB 375 grants no new land use powers to the MPOs. However, in order to meet the assigned emissions reduction targets, the SCS or APS is expected to call for more-compact development patterns that can be served by transit and other modes of transportation. These development patterns will be encouraged by the requirement that the SCS or APS both reduce greenhouse gas emissions (which are linked to vehicle miles travelled) and plan to accommodate regional housing needs (which are expected to continue to increase). Pursuant to SB 375, MPOs are expected to work with city and county authorities responsible for adopting general plans to guide community development, including by adopting housing elements as described below.

The regional housing needs allocation is statutorily linked to the housing element that must be adopted by each city and county as part of its general plan. The housing element must provide opportunities for the housing need assigned to the city or county to be filled through new construction or rehabilitation of housing. The housing need includes specific allotments for very low and low-income housing.

Preparation of the SCS is mandated by law and the ability of each SCS to meet the emissions reduction target for the [project area] must be reviewed and approved by the Air Resources Board. If implementation of the SCS would not meet the target, then the MPO must adopt an APS that would. However, the APS is not a required component of the regional transportation plan and therefore would be less likely to be implemented.

3.18.2.3 Regional and Transportation Plans

Compile an inventory of adopted regional plans related to land use, development, and transportation planning. At a minimum, discuss the regional transportation plans with approved sustainable community strategies (SCS) or alternative planning strategies per SB 375. SB 375 requires MPOs to consider regional growth projections in their SCS and related Regional Housing Needs Allocations as more fully discussed in Section 3.18.2.2 above. (The HSR project is not subject to regional plans; however, these planning documents provide a land use planning context for the evaluation of the incremental growth-inducing effect of the HSR project.)

Keep discussions brief and focused. Describe the regional growth policies contained in the applicable regional plan(s). Provide the title of the plan, citation, date of adoption, planning horizon year, and participating regional transportation planning agencies. The context of the regional plan and key policies should be summarized. The order of the plans discussed should be north to south along the HSR section. If helpful, use a tabular format similar to that used in the *Fresno to Bakersfield Section Final EIR/EIS* (Authority April 2014), or more recent HSR Project EIR/EIS, to organize and concisely report this information. This information will become part of Volume 2 Appendix 3.1-B Regional and Local Policy Inventory.

3.18.2.4 Local Plans and Policies

Compile a complete inventory of adopted local plans, ordinances, or guidelines related to land use development, rail projects, and station planning. (The HSR project is not subject to local land use plans and ordinances; however, these provide a land use development context for the evaluation of the incremental growth-inducing effect of the HSR project.) Keep discussions brief and focused. If helpful, use a tabular format similar to that used in the *Fresno to Bakersfield Section Final EIR/EIS*, or more recent HSR project EIR/EIS, to organize and concisely report this information. This information will become part of Volume 2 Appendix 3.1-B Regional and Local Policy Inventory.

Adopted local land use plans establish the extent, intensity, and pattern of future land uses within their planning areas. Describe the pertinent policies contained in the local plan(s). Provide the title of the plan, citation, date of adoption, and planning horizon year. Summarize the context of the regional plan and key policies. Discuss the plans in order from north to south along the HSR section with discussion of the county and city planning documents. This organization has been proven most helpful to readers of the EIR/EIS.

3.18.3 Regional and Local Policy Analysis

The overall structure of this discussion is presented in Section 3.0.3, Regional and Local Policy Analysis. As described in more detail in subsection 3.0.3.2, this analysis will describe any inconsistencies or conflicts with adopted regional or local policies and implementation of the HSR project.

3.18.4 Methods for Evaluating Impacts

The following discussion describes the development of the resource study area (RSA), key program studies, and quantitative and qualitative approaches for evaluating HSR effects on regional growth.

3.18.4.1 Definition of Resource Study Area

The RSA for regional growth encompasses a multi-county region to capture potential employment and population growth induced by the project. The short-term construction impacts are identified for the multi-county RSA, as well as the long-term induced employment and population affecting the multi-county RSA and projections disaggregated to the county level. County-level information is important for the land use consumption analysis, which has to consider the sub- county land use development trends. Table 3.18-1 identifies sources of information and general boundaries of the RSA relevant to regional growth.

Table 3.18-1 Environmental Resource Study Area for Regional Growth

Sources of Information	Resource Study Area
▪ Plans adopted by regional associations of governments and councils of governments ▪ Regional transportation plans/sustainable communities strategies ▪ County and city general plans ▪ County and city community, area, and specific plans	▪ Multi-county region established by the applicable metropolitan planning organization/association of governments/council of governments ▪ Geographic area (at the county and city level) rather than by HSR alternative

3.18.4.2 Key Program Regional Growth Studies

The following is a description of regional growth studies that may be of use in the analysis of potential regional growth impacts.

Bay Area to Central Valley Program EIR/EIS

The economic growth analyses performed for the Statewide Program EIR/EIS (Authority and FRA 2005) and *Final Bay Area to Central Valley High-Speed Train (HST) Program Environmental Impact Report/Environmental Impact Statement* (Authority and FRA 2008, Authority 2010) concluded that (1) the HSR would result in a small amount of induced population and employment growth statewide, and (2) that the largest growth effects would occur in Merced and Madera counties, followed by the remainder of the Central Valley. Program-level analysis found that additional urbanized growth statewide due to the HSR would be a small amount when compared to the overall level of growth that would occur under the No Project Alternative.

The economic analysis found that the largest employment shifts by sector would occur in the Central Valley and concluded that the HSR system could be a strong influence in attracting higher wage jobs to the Central Valley. Overall, the incremental employment effect would be much larger than the incremental population effect in all Central Valley counties. This suggests that the HSR system might be more effective at distributing employment throughout the state. Taken together, these results suggest that additional population growth resulting from the HSR would be driven by job growth due to the initiation of HSR service, rather than due to long-term population shifts from the Bay Area and Southern California based on long-distance commuting.

Economic Impact Analysis Report (April 2012)

This report provides updated information on the longer-term economic impacts of HSR on productivity, business competitiveness, market extension, and economies of specialization and business interaction around HSR stations. It provides literature research on the intangible affects stations have on attracting development in certain economic sectors. This information is relevant in describing how anticipated regional growth may be affected by the placement of high-speed rail stations.

In addition, the report provides background information on the anticipated levels of jobs from construction (including various calculation methodologies) and the possible productivity and long-term employment generated for the system as a whole. It is important to note the additional reference information that describes various experiences and the varied estimate results.

California High-Speed Rail and the Central Valley Economy (January 2015)

This report provides in depth information about that portion of the California Central Valley affected by the High-Speed Rail project – Fresno, Kern, Kings, Madera, Merced, Tulare, San Joaquin and Stanislaus counties. The region is California's agricultural heartland and its economy has evolved differently than the rest of the state. The High-Speed Rail project will provide increased access between the Valley and the state's major coast metropolitan areas such that new economic opportunities are anticipated. The study is grounded in economic and demographic data but is also informed by the knowledge and insights of stakeholders representing a range of organizations and institutions engaged in workforce preparation and economic development issues. The report examines the economic conditions, trends, issues and opportunities in this region in order to gain a deeper understanding of the economic issues in the Center Valley and further align the Authority's efforts with those of others collaborating to bring more economic prosperity to the Valley.

3.18.4.3 Methodology for Impact Analysis

The objective of the impact analysis is to evaluate whether or not the HSR project would cause regional growth substantially beyond what is already projected for the region. Analyze how the project may directly cause regional growth and the indirect effects of induced regional growth. The analysis should include both quantitative analysis and, where necessary, qualitative analysis for both construction and operation of the HSR system. (Note, the analytical results for construction impacts and operations impacts are presented separately in the EIR/EIS).

Group and consolidate information and discussion on potential regional growth impacts to communicate with the lay audience. Present detailed information related to changes in regional growth resulting from the proposed HSR alternatives in the EIR/EIS Volume 2 appendix, as appropriate, with specific reference to Section 3.18 subsections to help the reader navigate between volumes. Table 3.18-2 identifies impact sources and describes impacts to be considered in the regional growth analysis.

Table 3.18-2 Source and Description of Regional Growth Impacts

Source of Impacts	Description of Impacts
Initial construction activities with potential for impacts to regional growth	▪ Increase in near-term construction-related employment ▪ Increased sales tax revenues related to construction expenditures (as presented in Section 3.12) ▪ Temporary disruption of land use activities ▪ Reduction of sales and property tax revenues from parcels acquired prior to construction (as presented in Section 3.12) ▪ Substantial employment and population growth in an area beyond planned levels due to relocation of workers to the region as a result of construction-related employment opportunities, which may result in an influx of construction workers

Source of Impacts	Description of Impacts
Operations and Maintenance impacts from the operation of the project as a result of ongoing operation of the HSR system or the physical impact on the landscape by project facilities such as the stations, parking structures/lots, support facilities, and columns supporting elevated structures	▪ Substantial direct long-term employment required to operate and maintain the project ▪ Substantial employment and population growth in an area, beyond planned levels, either directly or as a result of multiplier effects, due to operations and maintenance of the project
Indirect and/or economic growth effects associated with changes in accessibility or other physical changes due to the projects construction.	▪ Substantial economic growth in an area, beyond planned levels, either directly or indirectly due to improved long-term mobility, labor market access, etc. ▪ Removal of growth obstacles (e.g., the establishment or expansion of an essential public service or the extension of a roadway to an area) ▪ Access changes to major population and/or employment centers ▪ Increased urbanization due to long-term employment or population growth beyond that anticipated in adopted local land use plans

Employment growth impacts of the project estimated by the EIR/EIS contractor should be those stemming from three primary sources: 1) the initial construction phase, 2) the operations and maintenance (O&M) phase on an ongoing, annual basis, and 3) the potential economic growth effects associated with improvements to accessibility.[1] The recommended approach to estimating these three sources of employment growth is summarized below. The approach to estimating employment impacts resulting from construction and O&M activities should apply the Bureau of Economic Analysis' (BEA) Regional Input-Output Modeling System (RIMS II) to costs associated with construction and O&M activities[2]. This approach is in line with industry standard practices for economic impact analysis and will ensure that HSR section-specific contractors' methodologies will be acceptable and consistent across all sections. However, the process to analyze employment impacts from improved accessibility is more involved.

Prior to beginning the analysis, the RC shall prepare a Regional Growth Methodology Memorandum that describes how quantitative information will be generated and how information from the various reports will be incorporated into the Regional Growth analysis.

This methodology will be presented to the RDP and Authority for review and concurrence. Following concurrence, the RC will proceed with the analysis in accordance with the approved methodology.

Construction and O&M Calculations

The total employment impacts of construction spending, including direct spending and indirect plus induced multiplier effects, should be estimated by EIR/EIS subcontractors for future years based on Bureau of Economic Analysis (BEA) Regional Input-Output Modeling System (RIMS II) Final Demand employment multipliers. These multipliers should be customized for each EIR/EIS defined regional growth multi-county impact area, the RSA.

[1] California High-Speed Rail Authority. 2017. Updated Environmental Methodology Guidelines for Regional Growth Estimates for Long-Term Employment and Population Increases. Prepared by Ira Hirschman, WSP | PB. January 27, 2017.

[2] Bureau of Economic Analysis; RIMS II: An Essential Tool for Developers and Planners; December 2013

One important caveat should be noted. The customized multipliers have or will be adjusted by BEA to remove economic impacts that would occur beyond the counties that comprise the regional growth RSA for each EIR/EIS section. These external impacts or “economic leakages” are defined as intermediate purchases made by businesses or consumer purchases by individuals who are located in the regional growth RSA from businesses located in counties outside of the regional growth RSA. As such, the economic impact analysis excludes impacts that would occur outside of the regional growth RSA, yet would still benefit the State of California as a whole.

Work related to the development of construction regional growth employment impacts should include the following steps:

1. Use the year 2040 population and employment projections from Section 3.12 Socioeconomics and Communities published by MPOs and cities in the regional growth RSA. The RC will allocate county-level population and employment throughout each county, and develop estimates of county population and employment growth that would occur with the HSR system.
2. Calculate construction-related employment created by the EIR/EIS section using BEA RIMS II multipliers. RIMS II multipliers are regional input-output multipliers used to estimate regional economic activity changes generated by changes in regional sectors of the economy.
3. Use the customized multipliers to calculate direct, indirect/induced, and total estimates for annual job years for each year of construction for the alternative alignments, stations, and HMF facilities, as appropriate. Present these estimates to give a range of total likely demand for construction-related workers. To avoid confusion on the part of the layperson regarding direct employment estimates, explain that the number of annual job years produced by the RIMS II modeling for each year of construction cannot be added to give total project construction jobs, but rather provide indication of annual peak employment numbers.
4. Identify the direct peak annual employment estimate and compare it to the forecast construction sector employment in the region for the approximate year peak employment would occur to determine if the demand for construction workers is likely to be met by the multi-county regional construction sector work force forecast. For the baseline condition, use the same employment forecasts from Section 3.12 Socioeconomics and Communities (see Bullet 1 above). Assess the context of this demand for construction sector workers based on same year forecast unemployment rates, if available.
5. For construction-related employment impacts alone, include a qualitative brief discussion to evaluate potential likelihood construction workers may move to the region for employment opportunities, whether or not their families may move to the region, and the potential for substantial effects on public services and utilities within the context of forecast growth in the region.

The analysis should follow the guidance in the table below. The consultants approach, selection and application of specific RIMS II multipliers should be covered in the Regional Growth Methodology Memorandum prepared by the RC.

The same method as described above should be used to calculate regional growth employment impacts associated with operations and maintenance of the EIR/EIS section of the High-Speed Rail project. The RC will use estimated forecast local operation and maintenance expenditure costs and calculate direct, indirect, and induced employment impacts for the regional growth RSA. The calculated demand for workers required for operations and maintenance will be compared to applicable forecast transportation sector employment at the start of operations of the EIR/EIS section to determine if such employment impacts would be substantial. The analysis should follow the guidance in the table below and the approach documented in the Regional Growth Methodology Memorandum.

Step	Notes
Collect latest estimates of construction costs and O&M costs.	Use the capital and O&M costs developed for the section contained in Chapter 5, Project Costs and Operations by year / phase; to the maximum extent possible, obtain costs disaggregated by line items such as rolling stock, communications and other systems, civil works, and track, etc. Line item expenditures for ROW acquisition should be excluded since the substantial cost associated with the purchase of ROW is not related to construction-related purchases.
Gather/collect most recent available output multipliers	The output multipliers can be obtained from the Bureau of Economic Analysis (BEA) for the multi-county regional growth RSA. Final demand employment multipliers are to be used and applied to the construction spending, as appropriate. Direct employment from any major maintenance facilities with significant staff levels planned along the HSR section should be captured.
Remove any potential cost exclusions from direct impact calculation	Exclusions to direct impacts typically apply to costs that do not require significant amounts of new local direct jobs, such as those related to right-of-way (ROW) acquisition and construction costs expended out of the local region.
Use final demand employment multipliers appropriate for each phase	For the construction phase, use: ▪ Construction sector (BEA, 23) for labor costs For the O&M phase, use: ▪ Rail transportation sector (BEA 482) or a direct employment affects multiplier may be used based on the O&M employment estimate. Multipliers to be used should be documented in the Regional Growth Methodology Memorandum noted above.
Additional Guidelines	**Notes**
Use constant dollars	A constant dollar base year should be selected, and the RIMS II multipliers should be adjusted to correspond with the constant dollar base year.
Express as person years of employment	To be consistent across HSR sections, employment impacts should be expressed as person years of employment. Tables and charts should also be generated to show employment demand over time, as well as an average annual employment figure

Accessibility Calculations

The RDP developed a methodology to estimate regional growth impacts associated from improved accessibility provided by the HSR system. The methodology considered a range of impact “factors” found in the literature, including elasticities of employment with respect to accessibility and employment ratios based on the corridor length. The analysis produced a range of estimates of the possible long-term employment increases. The focus was to use methods that sought to evaluate impacts that would result in long-term dynamic economic effects such as enhanced labor market accessibility, increased business travel and transactions, direct transport cost savings, improved business and worker productivity, support of tourism and other important service sectors requiring patron accessibility, etc. Specifically, the methodology assessed impacts

resulting from the project through 2050.[3] The horizon year was selected to capture all of the employment increases tied to increased accessibility and should be used to conservatively represent 2040 data, i.e., the horizon year evaluated in the EIR/EIS.

The results of these calculations yielded a range of forecasts from a low of about 52,000 additional permanent jobs to a high of about 189,000 jobs. The results are grouped at the low end and the high end of the range, depending on whether the approach used jobs per corridor mile (lower forecasts) or accessibility elasticities (higher forecasts). As such, a mid-range forecast is proposed for the EIR/EIS section analyses, which yields a statewide gain of about 102,000 jobs over and above the baseline employment forecast. This is a 0.44 percent gain in employment statewide over the forecast employment without the project.

To calculate the corridor-wide accessibility gains for labor and employment access, the percentage accessibility increases for each county experiencing a gain were weighted by the county’s share of the statewide total for labor and employment. The sum of the weighted averages of accessibility for the HSR corridor affected counties is 3.7 percent – higher than statewide because not all counties in the state would experience gains.

Specifically, it is proposed that the corridor-wide increase of 102,000 jobs be allocated to individual counties based directly on the weighted shares of increased accessibility. To do this, accessibility index values, defined as the product of the percentage of gain for each county multiplied by the county share of the statewide total, were calculated. The share of increase for each county was calculated as the accessibility score of the individual county divided by the total accessibility score for all counties experiencing gain. These calculations are shown in the table below. For example, Fresno County, which as the highest accessibility gain of all counties in the corridor, would receive about 26.2 percent of the total employment gain, or again 26,700 jobs (102,000 x .262).

Analysis related to the development of regional long-term employment growth because of increased accessibility should include the following steps:

1. Discuss the long-term employment impacts resulting from the improved accessibility created by the project. It is recommended that the consultant use the information summarized above and described in the *Economic Impact Analysis Report* (April 2012) to describe the complexities in evaluating these impacts.
2. Calculate the long-term job growth due to improved accessibility for the HSR section being evaluated by apportioning the 102,000 permanent jobs using the table below. The table highlights the average accessibility increase score for each county (the relative gain in accessibility for both labor market and job access). The column to the right indicates the share of overall induced employment growth for the Phase 1 system that should be allocated to each county, based on each county’s relative gain in accessibility. Allocation to EIR/EIS sections should be based on these county allocations.

[3] California High-Speed Rail Authority. 2017. Updated Environmental Methodology Guidelines for Regional Growth Estimates for Long-Term Employment and Population Increases. Prepared by Ira Hirschman, WSP | PB. February 13, 2017.

County	average accessibility increase score	% of employment gain
Fresno	0.0196	26.2%
Kern	0.0129	17.3%
Kings	0.0087	11.7%
LA Basin	0.0014	1.9%
LA North	0.0018	2.5%
Madera	0.0043	5.7%
Merced	0.0021	2.8%
Monterey	0.0024	3.3%
San Benito	0.0106	14.2%
Santa Clara	0.0058	7.7%
Santa Cruz	0.0024	3.2%
Stanislaus	0.0012	1.6%
Tulare	0.0010	1.3%
La- San Fernando	0.0003	0.4%
Orange	0.0000	0.0%
Riverside	0.0000	0.0%
Sacramento	0.0000	0.0%
San Bernardino	0.0000	0.0%
San Diego	0.0000	0.0%
San Francisco	0.0000	0.0%
San Joaquin	0.0000	0.0%
Alameda	0.0001	0.1%
San Mateo	0.0001	0.2%
All other counties	0.0000	0.0%
sum of scores	0.0748	100.0%

Note: Los Angeles County is comprised of three subareas: LA Basin, LA North, and La-San Fernando; and the percent of employment gain is the sum of the three subareas, or 4.8%.

3. In addition to the increases noted above, an additional increase should be qualitatively described for the two major metropolitan regions – the Bay Area and the Los Angeles Basin. The accessibility score does not adequately capture the larger and more dynamic economic effects on these regions. A premium could be added to employment growth affecting these areas due to the attraction to and from these two large metropolitan areas. Greater affects may occur due to larger labor market and inter-industry accessibility factors.

4. Compare the long-term job creation to long-term forecast employment for the HSR section RSA to determine if the induced employment growth due to improved accessibility would be substantial. Summarize the number of regional jobs and major sectors of the economy likely to experience growth, as appropriate.

Authors, please note. In calculating induced jobs due to improved accessibility, the analysis calculated total statewide jobs and distributed the jobs to the counties. This allows comparison of alternatives for one section. However, since this method does not allocate jobs by section the estimate is an over-estimate for sections located in counties with portions of two sections. As such, the calculation of induced jobs due to accessibility for the several sections cannot be summed to get the statewide impact.

In addition, the accessibility score does not adequately capture the larger and more dynamic economic effects on the two major metropolitan regions – the Bay Area and Los Angeles. In particular, it only reflects labor market accessibility gains (jobs to people and people to jobs), a limited perspective on accessibility. It does not take into account the relative dynamism and economic structure of individual sub-regions. For example, while the Los Angeles metropolitan region experiences relatively small accessibility gains, its economy is complex and has high-value added industry sections that benefit in particular from enhanced linkages to other metropolitan areas of the state, and to the global economy. Therefore, it is probably much better positioned to benefit from the overall connectivity provided by the HSR system. Note too that the Bay Area, the other global metropolitan region anchoring the corridor, essentially shows no gain in accessibility using the accessibility measures available for this analysis. However, like the Los Angeles metropolitan area its economy is complex and industrial sectors would benefit from the enhanced transportation linkages.

Long-term Population Impacts

It is reasonable to assume employment gains because of the HSR section long-term operation and maintenance employment and improved accessibility would result in some degree of population increase. These impacts are complex, and specific allocation of the population increase is often addressed through land use and transportation modeling systems of varying sophistication. Such an analysis, however, is beyond the scope of this assessment.

Even without such modeling, the impacts of long-term employment gains on the size and distribution of California's population would be a function of a number of factors. For example, some people would move about from one county or area in the state to another, filling gaps in a high demand location. The extent of this movement would depend on differentials in housing costs and supply, as well as labor market conditions in each area. Moreover, in some areas where employment would see an increase, labor markets may be sufficiently slack to absorb new employment opportunities by drawing more residents into the active labor force.

To complete the requirements of EIR/EIS analysis for secondary and induced impacts, a simple approach to estimating potential population changes associated with the long-term employment gains is to assume a constant population-to-employment ratio based on current demographic data available. A constant statewide employment-to-population ratio of 2.257 was calculated. Applying this ratio would estimate the average population impacts in a given EIR/EIS region. Specifically, the allocated gains in employment for each EIR/EIS region could be multiplied by 2.257 to calculate the increase in population. For Fresno County, for example, the gain in population could be estimated as the 26,700 employment increase multiplied by 2.257, or a population gain of about 60,320 persons (household increase would be smaller, based on the average statewide household size). However, to account for variations in regional family sizes and number of workers per household, the recommended approach is to calculate the population-to-employment ratio for the specific EIR/EIS section RSA and use the ratio to estimate increases in population. Similarly, average household size used to calculate increases in regional households should use the average household size calculated for the EIR/EIS section RSA.

The estimated increase in population should be compared to regional forecast population estimates for the horizon year of 2040 to determine if the increase is substantial and similarly compare the estimated increase in households to forecast housing needs. California state law requires local governments to prepare general plans, and a required element is the Housing Element to demonstrate the jurisdiction is able to meet its fair share of forecast housing needs. As part of this planning effort, the local Council of Government (COG) is required to develop a Regional Housing Need Plan to allocate the region's share of the statewide housing need to the

cities and counties within the region based on forecast population estimates. Based on forecast persons per household, the RC analyst can determine if the anticipated gain in population associated with the HSR section is within or outside of the range of allocated housing needs for the multi-county regional growth RSA. Also include a discussion to assess ways in which the project could foster growth and potentially result in substantial increased demand for public services and utilities.

Land Use Consumption

Finally, based on the estimated employment generated from the construction and O&M and the accessibility analysis above, generally evaluate the impacts of the added employment and population on the land development capacity of areas identified for future growth in city and county land use plans (i.e., infill and greenfield areas). Evaluate whether the adopted land use plans could accommodate the increment of population and employment growth related to the project. The analysis of land consumption should be based upon specific plans or other planned urban areas (for counties) as delineated by each city and county in their current general plans. It should also reflect any projected plans as available through approved Sustainable Communities Strategy (SCS) documentation and Authority Station Area Planning results. Identify areas where development pressures may conflict with adopted land use plans or policies for agricultural preservation, e.g., HSR stations located in an unincorporated or agricultural area.

Depending on the HSR section, it may be necessary to also qualitatively consider growth inducement that may differ between alignment alternatives (e.g., urban versus greenfield alignment), station alternatives (for areas with more than one station location option, urban versus greenfield or suburban station), or maintenance facility alternatives. For alternatives that would result in growth patterns likely to differ from those identified in city or county general, specific, or area plans, SCSs, or reports (e.g., development of a station (i.e., transportation hub) in an area not previously identified for development), describe how the alternative would affect regional growth as compared to previously identified growth patterns.

3.18.5 Affected Environment

The Affected Environment describes recent historic trends, existing, and projected population; employment and unemployment rates; and housing based on information available from council of governments and cities and counties general plan growth projections. In addition, the Affected Environment describes prior and on-going efforts to manage regional growth.

Include a concise summary description of this information within the RSAs and at proposed HSR facilities, if applicable. Use tables similar to those used in the *Fresno to Bakersfield Section Final EIR/EIS,* or more recent HSR project EIR/EIS, to organize and display this information. In particular:

- Document regional employment by industry and trends in employment growth. Include projected employment by industry and long-range employment projections, including a forecast employment for peak year of the planned construction. Describe labor force characteristics and unemployment rates by county, major cities, and unincorporated areas.
- Identify population growth trends and population projections by census designated place, city, county, region, and state. Use tables to organize and display the information.
- Identify housing characteristics in the region and projected housing needs based on population projections.

Cross-reference all sections of the EIR/EIS that describe regional growth issues or are related to regional growth using numbered subheadings by lowest heading tier (e.g., 3.X.X).

Table 3.18-3 identifies key information and typical sources from which to develop a complete description of the Affected Environment.

Table 3.18-3 Key Information and Sources for Affected Environment

Key Information	Sources of Information
▪ Use U.S. Census Bureau population and employment data, where possible ▪ Describe regional population and employment/unemployment characteristics (long-term/permanent, short-term/temporary) ▪ Use recently published employment and population projections for regional and local growth – Use data projections from regional associations or councils of governments – Alternative data sources may be used if the rationale is described in the Regional Growth Methodology Memorandum (see Section 3.18.8.2)	▪ *Statewide Program EIR/EIS* at www.hsr.ca.gov/Programs/ Environmental_Planning/index.html ▪ *Bay Area to Central Valley Final Program EIR/EIS*, ch. 5 at www.hsr.ca.gov/Programs/Environmental_Planning/ index.html ▪ *Economic Impact Analysis Report*, Parsons Brinckerhoff, April 2012 ▪ *Next Stop: California. The Benefits of High-Speed Rail Around the World and What's in Store for California*. CALPIRG, June 2010 ▪ *The Economic Impacts of High-Speed rail on Cities and their Metropolitan Areas*, June 2010, www.usmayors.org/ highspeedrail ▪ *Regional Economic Studies* at www. hsr.ca.gov/Newsroom/ studies_reports_archives.html ▪ Most recent environmental documents produced by the Authority (e.g., Fresno to Bakersfield Section Final EIR/EIS (April 2014), or more recent HSR project EIR/EIS) at www.hsr.ca.gov/Programs/Environmental_Planning/ index.html

3.18.6 Environmental Consequences

General formatting and terminology for constructing the discussion of environmental consequences is provided in Section 3.0.6, Environmental Consequences. The following direction is specific for the evaluation of Regional Growth. The heading structure for the Regional Growth EIR/EIS discussion is shown in Section 3.18.9.

Explain the results of the analysis in terms of the context of the affected environment described in Section 3.18.5. In particular, describe how the project would affect employment and population growth. Simplify impact discussions whenever possible with references or citations to more detailed information in the appendices. Use tables whenever possible to summarize the impacts and simplify the text.

Evaluate the following topics:

- Construction-related Employment Effects—Describe regional growth impacts common to all alternatives. Describe how construction of the alternatives would result in increases in property acquisition, change in property tax revenues and sales tax revenues (as presented in Section 3.12) related to construction. Consider how construction activities could temporarily disrupt land use activities and how the acquisition of affected parcels prior to construction would remove land from continued operation. Evaluate how construction of each alternative would result in new near-term construction-related employment. Evaluate the extent to which construction-related employment opportunities could result in relocation of workers to the region. Consider the availability of local workers as part of this evaluation. Estimate regional employment associated with construction of the HSR section; include the number of direct jobs created as well as the indirect and induced employment using RIMS II modeling for the track alignment, station alternatives and optional HMF sites. Direct employment refers to the jobs created to construct the project and primarily involves jobs created in the construction sector. Indirect employment refers to the jobs created in existing businesses in the region (e.g., material and equipment suppliers) that supply goods and services to project construction. Induced employment refers to jobs created in new or existing businesses (e.g., retail stores, gas stations, banks, restaurants, service companies) that supply goods and services to workers and their families.

- Operations-related Employment—Describe operations-related regional growth impacts common to all alternatives. Evaluate whether the employment opportunities created by the project have the potential to draw workers to the region. Evaluate the potential for project operation to improve state and regional connectivity and create job opportunities across many sectors of the regional economy. Assess whether the incremental growth in employment resulting from project operation and improved accessibility would be a net benefit for the region as a whole.
- Induced Population Growth—In general, a project may foster spatial, economic, or population growth in a geographic area if it removes obstacles to population growth (e.g., the establishment or expansion of an essential public service or the extension of a roadway to an area). Included in this definition of infrastructure projects that remove obstacles to growth are projects such as the HSR, which would facilitate travel between areas of California by providing an additional mode of transportation. Evaluate the extent to which operation of the project could incrementally increase population growth beyond current projections based on operations employment and improved accessibility.

Summarize regional projected and induced population and employment growth in a table similar to the following example (Table 3.18-4).

Table 3.18-4 Regional Projected and Induced Population and Employment Growth (example only)

County	2015 Estimate	2040 Projections Baseline	HSR Direct, Indirect, and Induced Growth*	HSR Increased Accessibility Growth*	Total HSR Induced Growth	Total 2040 HSR Alternative Projections	Growth
Population							
Fresno	980,980	1,271,051	770	32,023	32,793	1,303,844	2.6%
Kings	149,813	201,071	440	8,269	8,709	209,780	4.3%
Tulare	465,013	622,930	550	24,379	24,929	647,859	4.0%
Kern	884,436	1,160,259	880	45,978	46,858	1,207,117	4.0%
TOTAL	**2,480,242**	**3,255,311**	**2,640**	**110,649**	**113,289**	**3,368,600**	**3.5%**
Jobs							
Fresno	371,900	475,800	350	18,549	18,899	494,699	4.0%
Kings	46,100	59,300	200	2,720	2,920	62,220	4.9%
Tulare	157,000	200,300	250	8,996	9,246	209,546	4.6%
Kern	317,500	396,800	400	17,171	17,571	414,371	4.4%
TOTAL	**892,500**	**1,132,200**	**1,200**	**47,436**	**48,636**	**1,180,836**	**4.3%**

NOTE: * County numbers used in this column are not actual values or calculated appropriately. They are illustrative only.

- Land Use Consumption—Using information from the example Table 3.18-4, evaluate the potential for the incremental population and economic growth resulting from the project to increase urbanization beyond that anticipated in adopted local land use plans. Consider the extent to which anticipated station area development might accommodate the project-related demand and whether infill and higher-density development in existing urban areas reflected in an adopted regional Sustainable Communities Strategy may accommodate such demand. The estimates of population and employment growth attributable to the project should be for the year 2040.

3.18.7 Impacts Summary

In this section, compare and contrast the construction impacts by alternative and summarize operations impacts of the HSR project, considering each topic identified in Section 3.18.6.

Present this information in a table suitable for incorporation in the Executive Summary Chapter of the EIR/EIS.

3.18.8 Products

The RC is responsible for preparing the following products, under Authority and FRA direction, according to RDP guidance and subject to RDP quality control and assurance.

3.18.8.1 Technical Report or Appendix

In addition to the Volume 1 impacts analysis chapter, provide Volume 2 appendices where full analysis applicable to the HSR project section requires details in excess of efficient inclusion in the EIR/EIS Volume 1 chapter. For example:

1 Volume 2, Appendix 3.1-B, Regional and Local Policy Inventory

2 Volume 2, Appendix 3.18-A, RIMS II Modeling Details

3.18.8.2 Project EIR/EIS Volume 1

1. Regional Growth Methodology Memorandum
2. Summary/Table for EIR/EIS Executive Summary
3. Affected Environment, Environmental Consequences Section: Regional Growth

3.18.9 Regional Growth EIR/EIS Outline

The RC will use the following outline for organizing content related to regional growth in Chapter 3 of the project EIR/EIS, using the heading hierarchy and format as indicated.

- 3.18 Regional Growth
  - 3.18.1 Introduction
  - 3.18.2 Laws, Regulations and Orders
    - 3.18.2.1 Federal
    - 3.18.2.2 State
    - 3.18.2.3 Regional and Transportation Plans
    - 3.18.2.4 Local Plans and Policies
  - 3.18.3 Regional and Local Policy Analysis
  - 3.18.4 Methods for Evaluating Impacts
    - 3.18.4.1 Definition of Resource Study Area
    - 3.18.4.2 Methodology for Impact Analysis
  - 3.18.5 Affected Environment
    - 3.18.5.1 Employment and Unemployment
    - 3.18.5.2 Population
    - 3.18.5.3 Housing Demand
  - 3.18.6 Environmental Consequences
    - 3.18.6.1 Overview
    - 3.18.6.2 No Project Alternative
    - 3.18.6.3 High-Speed Rail Alternatives
      - Construction Impacts
        - Common Regional Growth Impacts
        - Construction-Related Employment

HSR Project Impacts

Common Regional Growth Impacts

Operations-Related Employment

Induced Population Growth

Land Use Consumption

3.18.7 Impacts Summary

(subheadings below are optional, use as needed)

3.18.7.1 Construction Impacts

3.18.7.2 HSR Project Impacts

3.19 Cumulative Impacts

The methodology guidelines in this section are organized by a sequence of steps for preparing the analysis of cumulative impacts. Section 3.19.9 provides an outline for this section of the environmental impact report/environmental impact statement (EIR/EIS). Section 3.0, General Methodology Guidance for Resource Sections, provides the methodological framework common to the evaluation of all resource areas. Use Section 3.0 and this section in combination with each resource section in Chapter 3 when developing the EIR/EIS analyses. The cumulative impact analyses will be a separate section of the EIR/EIS rather than part of each individual resource section.

3.19.1 Introduction

The general method for preparing an introduction to a resource section is provided in Section 3.0.1, Introduction. The following discussion presents direction specific to Cumulative Impacts.

State that the cumulative impact analysis complies with the National Environmental Policy Act (NEPA) (40 C.F.R. Part 1508.25)) and the California Environmental Quality Act (CEQA) Guidelines (Cal. Code Regs., tit. 14, § 15130) as further described in Section 3.1. Identify federal, state and local agency documents used in the preparation of the cumulative impacts analysis, including any guidance documents. Note that the section presents an analysis of the cumulative effects of implementing the high-speed rail (HSR) alternatives in combination with other past, present, and reasonably foreseeable future projects that contribute to those effects. For purposes of this analysis, "reasonably foreseeable future projects" are defined as those that are likely to occur within the 2040 planning horizon for the HSR project. Further state that the focus of the cumulative impacts analysis is on the [HSR section name] Section of the HSR System and the regional context appropriate for each resource area.

Identify any crucial issues or concerns relating to the consideration of cumulative impacts, preferably in a bullet or tabular format, using the best and most recent data available. Identify any measures incorporated into the project that avoid or reduce the project's contribution to cumulative impacts based on substantial evidence, which can be documented in detail in an appendix. Identify any resource areas that will not be considered in the cumulative impacts assessment and the reasons why they are not included.

3.19.2 Laws, Regulations, and Orders

Federal, state, and local laws, regulations, orders or plans germane to the assessment of cumulative impacts are presented below. General NEPA and CEQA requirements for assessment and disclosure of environmental impacts are described in the EIR/EIS Section 3.1, Introduction, and are therefore not restated in the resource section of the chapter. NEPA and CEQA requirements specific to the evaluation of cumulative impacts are, however, described in this section.

3.19.2.1 Federal

National Environmental Policy Act (42 U.S.C. § 4321 et seq.; 40 C.F.R. Part 1500–1508)

Pursuant to NEPA regulations, project effects are evaluated based on the criteria of context and intensity. Context means the affected environment in which a proposed project occurs. Intensity refers to the severity of the effect, which is examined in terms of the type, quality, and sensitivity of the resource involved; location and extent of the effect; duration of the effect (short- or long-term); and other considerations. Beneficial effects are identified and described. When there is no measurable effect, an impact is found not to occur. The intensity of adverse effects is the degree or magnitude of a potential adverse effect. Context and intensity are considered together when determining whether an impact is significant under NEPA.

Under NEPA, a cumulative impact is the impact on the environment that results from the combination of incremental impacts of the action and other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal), entity, or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions that take place over a period of time (40 C.F.R. Part 1508.7). A cumulative impact includes the combined effect on a natural resource, ecosystem, or human community that is attributable to past, present, or reasonably foreseeable future activities and actions of federal, nonfederal, public, and private entities. Cumulative impacts may include the effects of natural processes and events, depending on the specific resource. Accordingly, there may be different levels of cumulative impacts on different environmental resources.

National Historic Preservation Act (36 C.F.R. Part 800)

The regulations implementing Section 106 of the National Historic Preservation Act acknowledge that a project's adverse effects include any that are reasonably foreseeable, even if they may occur later in time, are farther removed in distance, or are cumulative. The consideration of indirect and cumulative impacts is required when applying the criteria of adverse effect on historic properties (36 C.F.R. Section 800.5(a)(1)) and delineating the area of potential effects (36 C.F.R. Section 800.16(d)) as part of the Section 106 process.

Clean Water Act (33 U.S.C. § 1251 et seq.)

Section 404 of the Clean Water Act requires the assessment of potential cumulative impacts on jurisdictional waters of the U.S., including special aquatic sites, protected by Section 404 of the federal Clean Water Act, which are under the jurisdiction of the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency. For more information, see Section 404 of the Clean Water Act and the 404(b)(1) guidelines.

Federal Endangered Species Act (15 U.S.C. § 1531 et seq.)

Cumulative effects are defined differently under FESA, Section 7, than under NEPA. Section 7 regulations require the district biologist to provide an analysis of cumulative effects when requesting initiation of formal consultation. The Section 7 definition of cumulative effects state that they are those effects of future State or private activities not involving federal activities that are reasonably certain to occur within the action area that is subject to consultation with the service(s). Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the act.

3.19.2.2 State

California Environmental Quality Act (Cal. Code Regs., tit. 14, § 15000 et seq.)

Similar to NEPA, cumulative impacts under CEQA are defined as two or more individual effects which, when considered together, are considerable or compound or increase other environmental impacts. The cumulative impact from several projects is the change in the environment that results from the incremental impact of a project in combination with other closely related past, present, and reasonably foreseeable future projects. Cumulative impacts can result from the combination of individually minor but collectively significant projects over a period of time (CEQA Guidelines Section 15355).

Under CEQA, when a project would contribute to a cumulative impact, an EIR must discuss whether the project's incremental effect is "cumulatively considerable." Cumulatively considerable means that the project's incremental effect is significant when viewed in the context of past, present, and reasonably probable future projects. The discussion of cumulative impacts need not provide as much detail as is provided for the effects attributable to the project alone (CEQA Guidelines Section 15130(b)). CEQA does not require an EIR to analyze cumulative impacts to which the project would not contribute.

The CEQA analysis involves a two-step process. First, consider whether the project, in combination with other projects, creates a significant cumulative effect. If not, explain briefly why not, and the analysis for that particular cumulative resource area ends (CEQA Guidelines Section 15130(a)(2)). The second step is when a project would contribute to a significant cumulative impact. In that case, an EIR must discuss whether the project's incremental contribution is "cumulatively considerable." The incremental effect of the individual project is not simply compared against other related projects, but is added to the anticipated impacts of other projects. This evaluation should consider the project's effects after mitigation measures have been applied.

3.19.3 Methods for Evaluating Impacts

Evaluation of cumulative impacts is a requirement of CEQA and NEPA as described in Section 3.19.2. The Program EIR/EIS included an evaluation that was broad but sufficient for the purpose of identifying potential cumulative impacts from the statewide system. Each project EIR/EIS will provide a more detailed evaluation of cumulative impacts based on the project-level evaluation in Chapter 3. This section describes the methodology for developing the cumulative impacts analysis under CEQA and NEPA.

Developing the cumulative impacts analysis will require coordination between the Regional Consultant (RC) technical specialist and the RC team cumulative lead. The RC technical specialist will prepare the cumulative impact analysis for their specific resource. The RC team cumulative lead will use each resource section's cumulative impact analysis to develop the EIR/EIS cumulative section. The RC team cumulative lead will identify what plans/projections or list of projects will be used in the analysis and distribute to the RC technical specialist. The RC team cumulative lead will work with the RC technical specialist to review and develop mitigation measures to reduce or avoid the project's contribution to any identified significant cumulative impact.

Sources for this methodology include *Caltrans Guidance for Preparers of Cumulative Impact Analysis* (February 2012) (see www.dot.ca.gov/ser/cumulative_guidance/approach.htm), the Council on Environmental Quality's (CEQ) *Considering Cumulative Effects Under the National Environmental Policy Act* (CEQ 1997) (CEQ handbook), and the CEQA Guidelines.

3.19.3.1 Definition of Environmental Resource Study Area

The resource study area (RSA) is the area in which all environmental investigations specific to each affected resource are conducted to determine the resource characteristics and potential impacts of the HSR project. For cumulative impacts, the RSA also includes the geographic extent of each affected resource within which project impacts accumulate or interact with the impacts of other actions, including adjacent HSR sections. While Section 3.0.4.1 discusses the factors making up the RSA for each resource area (including an illustrative figure), the RSA for cumulative effects will be a larger area as identified on Table 3.19-1 and will consider adjacent HSR project sections to ensure a broad consideration of impacts on a more regional and statewide basis.

Identify the RSA for each resource that will be used for the cumulative impacts analysis and coordinate with the RC cumulative lead in identifying any modifications to the RSA necessary to fully analyze the potential cumulative impacts of the project section. Depending on the resource area, the RSA for the cumulative impacts analysis will usually be broader than the boundary used for analyzing the project's direct impacts. There also may be more than one RSA per resource (e.g., for biology there may be more than one habitat or species; for air quality there may be a carbon monoxide impact with a small RSA or a basinwide RSA for other impacts; for land use there will be a different RSA for HSR alignment and wayside facilities than for HSR stations and maintenance facilities). Explain the rationale for choosing an RSA boundary.

Table 3.19-1 Possible Resource Study Areas for Cumulative Analysis

Resource	Possible RSA
Air quality and GHGs	Air basin or global atmosphere (GHGs)
Water quality	Stream, watershed, river basin, estuary, aquifer, or parts thereof
Vegetative	Watershed, forest, range, or ecosystem
Biological communities	Species habitat or ecosystem
Wildlife movement/ migration corridors	Breeding grounds, migration route, wintering areas, or total range of affected population units
Fishery	Stream, river basin, estuary, or parts thereof; spawning area and migration route
Historic	Tribal territory, known or possible historic district
Sociocultural	Neighborhood, community, distribution of low-income or minority population, or culturally valued landscape
Land use	Community, metropolitan area, county, state, or region
Coastal zone	Coastal region or watershed
Agriculture	County or region
Socioeconomics	Community, metropolitan area, county, state, or country

Source: Modified from CEQ 1997.
GHG = greenhouse gas

3.19.3.2 Methodology for Impact Analysis

Explain the research and analysis methods used to determine environmental consequences (e.g., screening, data collection methods and sources, inventory of regional and local conditions, evaluation of analytical context, qualitative or quantitative data analysis techniques). Include a clear and thorough description of the methodology used to identify the cumulative significant impacts, the existing conditions (including historic context and health of the resource), the reasonably foreseeable past, present, and future actions that contribute to the cumulative impacts, and the resulting characterization of the contributions of the project in the context of the cumulative significant impacts. Group or consolidate the information and discussion to effectively present content to the lay audience (i.e., by distinct resource characteristic or component, such as air quality, biological resources, aesthetics).

Identify Resources Included in the Cumulative Impacts Analysis

Based on the Chapter 3 evaluations determine which resources would be impacted by the project and should therefore be included in the cumulative impacts analysis. Coordinate with the Program Management Team (PMT) and RC team cumulative lead to determine what resources will be considered in the cumulative impact analysis. Do not include resources which clearly are not subject to a cumulative impact or resources not impacted by the project, and document in writing the rationale for not including these resources.

Describe Current Health and Historical Context of Resources of Concern

Before starting the analysis of cumulative impacts, it is important to understand how key resources, ecosystems, and human communities have been altered by past and current human activities, including past and present projects. Provide a qualitative or quantitative analysis of the potential impacts of the past and present activities within the RSA and how they impact each resource. Identify and describe the current health and historical context of each resource to which the HSR project alternatives could contribute a cumulative impact. In this context, "health"

refers to the overall condition, stability, or vitality of a resource. When identifying the health of a resource, start with the discussion from the affected environment sections in Chapter 3 but include additional information as necessary and use the RSA identified as part of Section 3.19.3.1 above. Where possible, identify trends in the condition of resources, ecosystems, and human communities.

Include important stress factors and pertinent environmental regulations and standards in the discussion of historical context. The goal of characterizing stresses is to determine whether the resources, ecosystems, and human communities of concern are approaching conditions where additional stresses will have an important cumulative effect. Use two types of information to describe stress factors: (1) the types, distribution and intensity of key social and economic activities in the region and (2) individual indicators of stress on specific resources, ecosystems, and human communities. Maps of past and existing activities can indicate stresses placed on the resources. Regulatory, administrative, and planning information can also help define the condition of the region and the development pressures occurring within it. Pay special attention to common natural resource and socioeconomic issues that arise as a result of cumulative effects.

Provide the RC team cumulative lead with descriptions of the health and the historical context of each resource (see www.dot.ca.gov/ser/cumulative_guidance/approach.htm and the CEQ handbook).

Determine Method for Identifying Reasonably Foreseeable Past, Present, and Future Actions

For each resource included in the cumulative impacts analysis, identify the reasonably foreseeable future actions. First determine whether plans/projections or a project list or plans will be used to identify reasonably foreseeable future environmental conditions for the resource. Then coordinate with the RC team cumulative lead on the method of analysis (plan/projection or project list). Assess the potential cumulative impacts based on the analysis of the project in relation to existing plans or, where pertinent, a list of past, present, and reasonably foreseeable projects and the contributions of those projects to the cumulative impact. In general, a project list is better for resources with constrained RSAs, such as biological resources, whereas the plan/projections method is better for larger RSAs, such as Air Quality.

Suitable projections are those contained in an adopted plan (local, regional, statewide) or related planning document that describes or evaluates conditions contributing to the cumulative impact. This may include a general plan, community plan, specific plan, regional transportation plan, plan for the reduction of greenhouse gases, or regional modeling program. In cases where local plans are outdated, augment with additional, more updated "other projects" information, and explain the reason for the augmentation.

If the analysis is to use a project list approach, provide the RC resource specialist with the database of information for those projects. This will be limited to those projects that are contributors to the same cumulative impact as the HSR project. For purposes of compiling the list, "reasonably foreseeable future projects" is defined to mean those that are likely to occur within the 2040 planning horizon for the HSR project. Explain why certain projects are not being included on the cumulative project list. A typical reason is that the project is conceptual and lacking in sufficient detail to allow analysis.

Generally, projects will be considered "reasonably foreseeable" if they include at least one of the following:

- Have applications pending with a government agency
- Have a certified environmental document
- Are included in an agency's budget or capital improvement program
- Are foreseeable future phases of existing projects

Consider whether factors are present that require the identification and consideration of projects that do not qualify under one of the four factors in the bullet list above, yet should nonetheless be included in the list of reasonably foreseeable projects. Coordinate with the RC cumulative lead to determine what assumptions will be made in the cumulative impact analysis to account for unknown impacts of future impacts (such as for projects in the early planning stages or without a certified environmental document).

Coordinate with local land use agencies and officials, including the review of adopted plans and similar documents to identify reasonable foreseeable projects. Survey and consult with local landowners, developers, real estate agencies, or other individuals with special expertise within the proximity of the RSA.

Describe and map the location of the projects included in the list for cumulative analysis (major development projects, major infrastructure projects, highway, transit, airport, rail improvements, projects in the Regional Transportation Plan, etc.). Describe the location, size, implementation dates for the cumulative projects, as well as the reference sources (environmental documents, etc.), from which data is obtained to include in the cumulative analysis.

Assess Cumulative Impacts

As noted in the Caltrans Guidance, cumulative effects can be assessed using a variety of methods and tools that should be selected on a case-by-case basis for each resource being analyzed. Chapter 5 of the CEQ handbook also describes various methods or tools for evaluating cumulative impacts. Table 3.19-2 identifies key information and sources for the impact analysis.

Table 3.19-2 Key Information and Sources for Impact Assessment

Key Information	Sources of Information
▪ Projects and other relevant activities that will affect the resource shown on a map and described in a table (when using list method) ▪ Growth and development anticipated by existing plans and policies shown on a map and described in a table (when using the plan/ projections method) ▪ Geographic boundaries of the area that will be impacted by the project and reasonably foreseeable projects ▪ Beneficial and adverse impacts of the project on the resource ▪ Mitigation measures identified to reduce the contribution of the project	▪ Program EIR/EIS ▪ Scoping comments from state and local agencies as well as he public ▪ Regional Transportation Plan ▪ Regional Transportation Improvement Plan ▪ Plan for the reduction of greenhouse gases ▪ General plans, specific plans, community plans ▪ Conversations/interviews with local and regional planning agencies regarding reasonably foreseeable projects ▪ An agency's budget and capital improvement program ▪ Recent environmental documents for other large-scale project near stations and corridor alternatives ▪ Consultation with local landowners, developers, real estate agencies, or other individuals with special expertise

Include the following in the assessment of impacts:

- A description of the cumulative impact being analyzed and a determination of whether the impacts of the project in combination with past, present, and reasonably foreseeable future actions would result in a significant cumulative impact. Consider the existing health and historical context of the resource when making this determination. If the cumulative impact is not significant, then explain the reason for that conclusion and no further discussion is

necessary. If the HSR project makes no contribution to a particular resource area, then explain that fact and no further analysis is necessary for that resource.

A summary table is recommended to illustrate the cause-and-effect relationships of past, present, and reasonably foreseeable probable future projects in combination with the project impacts. Example narrative and quantitative tables from the CEQ handbook are provided below (**Error! Not a valid bookmark self-reference.** and Table 3.19-4). Additional examples are provided in Chapter 4 of the CEQ handbook.

Table 3.19-3 Summary of Cumulative Effects (Narrative)

Resource	Past Actions	Present Actions	Future Actions	Project Impacts	Cumulative Effect
Air Quality	Impacts dissipated	Noticeable deterioration in visibility; but standards met	Increase in auto emissions expected	Visibility affected during operations, but standards met	Standards possibly violated
Fish	Decrease in numbers and species diversity	Occasional documented fish kills	Loss of cold-water species due to temperature change.	Increase in number of fish kills	Significant decline in numbers and species diversity
Wetlands and other Waters	Large reduction in acreage of wetlands	Loss of small amount of wetland annually	Continued loss of wetlands	Disturbance of 5 acre wetland	Significant cumulative loss of wetlands

Source: Modified from CEQ 1997.

Table 3.19-4 Summary of Cumulative Effects (Quantitative)

Resource	Past Actions	Present Actions	Future Actions	Project Impacts	Cumulative Effect
Air Quality	No effect on SO_2	20% increase in SO_2	5% increase in SO_2	10% increase in SO_2	35% increase in SO_2
Fish	50% of 1950 fish population lost	2% of fish population lost	1% of fish population lost	5% increase in fish population	48% of 1950 fish population lost
Wetlands and other Waters	78% of wetlands lost	1% of existing wetlands lost annually for 5 years	1.5% of existing wetlands lost annually for 10 years	0.5% of existing wetlands lost	95% of wetlands lost in 10 years

Source: Modified from CEQ 1997.
SO_2 = sulfur dioxide

- If the cumulative impact is significant, explain the facts and rationale for this conclusion, which may include specific thresholds required under law or by agency regulations. An example of a threshold includes air quality thresholds set by the applicable air quality management district or air pollution control district. In the absence of specific thresholds, include a description how the resource is specifically impacted and why that impact would be considered significant. In many cases, this explanation will include a reference to the contributions from the most relevant reasonably foreseeable action identified using the project list or plan to the particular cumulative impact.

- Without a definitive threshold, compare the cumulative contributions of multiple actions with appropriate national, regional, state, or community standards to determine whether the total impact is significant. The integrity of historic districts is an example of such a comparison. Though individual structures of particular architectural distinction are often present, such districts are important because they are a collection of structures that relate to one another visually and spatially; the primary importance of each building is the contribution that it makes to a greater whole. The demolition of an individual structure does not significantly diminish the historic and architectural character of the district and indeed may be beneficial to the overall stability of the district, but the cumulative effect of a whole series of such demolitions can significantly erode the district. The incremental loss of historic structures over time, often with resultant vacant lots and incompatible new construction, can reach a point where the integrity of the district is lost.
- Identify the direct and indirect impacts of the proposed HSR project that contribute to the significant cumulative impact and determine whether the HSR project's incremental contribution is cumulatively considerable. This determination should take into consideration the effectiveness of the mitigation measures to reduce or avoid the HSR project's contribution. Mitigation measures can include measures specific to the HSR project and measures in an existing program for the reduction of the cumulative impact with which the HSR project will comply. The latter includes fee programs for the purpose of reducing the cumulative impact. Reference and appropriately summarize detailed discussions of mitigation measures.
- Should a newly identified significant cumulative impact be identified that was not analyzed as a significant impact from the project alone, and the incremental contribution from HSR is cumulatively considerable, develop further mitigation measures that would reduce or avoid the HSR project's contribution to the cumulative impact. Coordinate with the RC team cumulative lead when identifying additional mitigation measures.

3.19.3.3 Method for Evaluating Effects under NEPA

Pursuant to NEPA regulations, the significance of effects is evaluated based on the criteria of context and intensity. In its implementing regulations for NEPA, CEQ states that "the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality" (40 C.F.R. Section 1508.27). Intensity refers to the severity of effect (40 C.F.R. Section 1508.27). Factors that have been used to define the intensity of effects include the magnitude, geographic extent, duration, and frequency of the effects. Determining the significance of cumulative effects requires the following considerations[1]:

- Compare cumulative effects to the environmental baseline and relevant regulatory thresholds when determining significance. The baseline condition of the resource of concern should include a description of how conditions have changed over time and how they are likely to change in the future without the proposed action.
- Thresholds and criteria (i.e., levels of acceptable change) used to determine the significance of effects will vary depending on the type of resource being analyzed, the condition of the resource, and the importance of the resource as an issue (as identified through scoping).
- Delineate the cause-and-effect relationships for each resource to identify cumulative effects and determine the responses of the resource to the resulting environmental change.
- Determine whether the cumulative effects exceed the capacity of the resource to sustain itself in the future and remain productive. Similarly, the natural ecosystem and the human

[1] Please see Chapter 4 of the CEQ Handbook for a more detailed discussion of determining the significance of cumulative effects.

community have maximum levels of cumulative effects that they can withstand before the desired conditions of ecological functioning and human quality of life deteriorate.

- Where a quantitative evaluation is possible, identify and describe specific criteria for significance. These criteria should be directly related to the relevant cause-and-effect relationships and reflect the resilience of the resource, ecosystem, and human community to the effects that are likely to occur.
- Without a definitive threshold, compare the cumulative effects of multiple actions with appropriate regional, state, or community standards to determine whether the total effect is significant.

3.19.3.4 Method for Evaluating Effects under CEQA

CEQA requires an evaluation of a project's contribution to cumulative environmental impacts to determine whether it is considerable. Although the impact of an individual project may be less than significant, when considered in combination with other projects that contribute to the same impact, the project's contribution to the cumulative impact may nonetheless be considerable. CEQA Guidelines Section 15130 provides the following direction regarding a cumulative impact analysis:

- An EIR should not discuss cumulative impacts that do not result, in part, from the proposed project.
- The discussion of cumulative impacts need not provide as much detail as is provided for the effects attributable to the project alone.
- A lead agency may determine that an identified cumulative impact is less than significant and shall briefly identify facts and analysis in the EIR supporting its determination.
- A lead agency may determine a project's incremental effect is not cumulatively considerable and, therefore, not significant and shall briefly describe in the EIR the basis for its determination.
- A project's incremental contribution may be considered less than cumulatively considerable if the project is required to implement or fund its fair share of a mitigation measure designed to alleviate the cumulative impact within the appropriate geographic area, and adopted by the public agency with jurisdiction over the affected resources. (CEQA Guidelines Section 15064(h)(3))

3.19.4 Affected Environment

Describe the environmental health and historical context for each resource within the RSA that may be impacted by the project (see Section 3.19.3.2). Focus the descriptions of the affected environment on how the existing conditions of key resources, ecosystems, and human communities have been altered by past and present activities. Include important human stress factors and pertinent environmental regulations and standards. Where possible, identify trends in the condition of resources, ecosystems, and human communities. Present this information in the geographic segments defined in Chapter 2, Alternatives, of the EIR/EIS, except when presenting regional information, which may encompass several segments.

3.19.5 Environmental Consequences

Include the following descriptions and discussions for each resource as detailed previously in Section 3.19.3.2 when preparing the environmental consequences section:

- The geographic boundaries of the RSA for each resource. This will be the area of impact for the cumulative analysis.

- The methodology used to identify future cumulative changes to resources within the RSAs. If using a projections approach, identify the source of the projection (See Table 3.19-2 for examples of such sources). If using a project list approach, create a figure showing the locations of the projects. Include a list of the projects and their expected contributions as an appendix. This appendix should have sufficient detail about the types and extent of impacts that it can be used to describe the overall relationship of the project to the relevant cumulative impacts.
- A description of the cumulative impact to the resource resulting from the project's incremental contribution in combination with the contributions of past, present and reasonably foreseeable probable future projects, and whether the resulting cumulative impact would be significant, taking into consideration the identified mitigation measures to reduce the project's contribution. If the cumulative impact is not significant, no further analysis is necessary. If the impact is significant, evaluate the project's incremental contribution to the significant cumulative impact.
- A description of the project's incremental contribution to the significant cumulative impact and a determination of whether this contribution would be "considerable" under CEQA, taking into consideration the identified mitigation measures to reduce the project's contribution.
- An identification of mitigation measures for any newly identified significant cumulative impacts that were not analyzed as a significant impact from the project alone.

3.19.6 Avoiding, Minimizing, and Mitigating Significant Cumulative Impacts

Coordinate with the RC team cumulative lead in identifying mitigation for the HSR project's contribution to the significant cumulative impacts. Reference and summarize detailed discussions of mitigation measures in the EIR/EIS. Identify reasonable, feasible options for avoiding or mitigating the project's contribution to significant cumulative impacts. These may or may not be in addition to project-specific (i.e., Chapter 3) mitigations. Identify any existing programs, including fee programs, for the reduction of the pertinent significant cumulative impact to which the project will contribute.

3.19.7 Impacts Summary

Give a general overview of the significant cumulative impacts and how the different alternatives vary in their level of contribution (include a table that describes any significant cumulative impacts after mitigation and any findings of cumulatively considerable incremental contributions from the project after mitigation). Discuss how various mitigation measures apply in the impacts and significance of impacts based on various project phases and construction/operation impacts.

Develop this subsection to facilitate drafting of the summary of potential effects in the Record of Decision. Summarize cumulative impacts and conclusions, but not at the level of detail for the project impacts summary. The subsection for each resource should be organized by geographic segment and alternative. Since the HSR project does not contribute to impacts under the No Project scenario, the cumulative impacts analysis does not apply to the No Project Alternative.

3.19.8 Products

The RC is responsible for preparing the following products, under the California High-Speed Rail Authority and Federal Railroad Administration direction, according to PMT guidance and subject to PMT quality control and assurance.

3.19.8.1 Technical Report or Appendix

In addition to the Volume 1 impacts analysis chapter, provide technical reports and Volume 2 appendices where full analysis applicable to the HSR project section requires details in excess of efficient inclusion in the EIR/EIS Volume 1 chapter. For example:

1. Appendix 3.19-A Cumulative Project List

3.19.8.2 Project EIR/EIS Volume 1

1. Summary/Table for EIR/EIS Executive Summary
2. Affected Environment, Environmental Consequences, and Mitigation Measures Section: Cumulative Impacts

3.19.9 Cumulative Impacts EIR/EIS Outline

The RC will use the following outline for organizing content related to cumulative impacts in Chapter 3 of the project EIR/EIS, using the heading hierarchy and format as indicated.

- 3.19 Cumulative Impacts
  - 3.19.1 Introduction
  - 3.19.2 Laws, Regulations, and Orders
    - 3.19.2.1 Federal
    - 3.19.2.2 State
  - 3.19.3 Methods for Evaluating Impacts
    - 3.19.3.1 Identifying Resources for Cumulative Impact Analysis
    - 3.19.3.2 Determining RSA and Timeframe for Analysis
    - 3.19.3.3 Cumulative Project List or Regional Projections
    - 3.19.3.4 Impact Thresholds
  - 3.19.4 Affected Environment
    - 3.19.4.1 Project Segment 1
      - Current Health and Historical Context of Resource 1
      - Current Health and Historical Context of Resource 2
      - Current Health and Historical Context of Resource 3
      - Current Health and Historical Context of Resource N
    - 3.19.4.2 Project Segment 2
      - Current Health and Historical Context of Resource 1
      - Current Health and Historical Context of Resource 2
      - Current Health and Historical Context of Resource 3
      - Current Health and Historical Context of Resource N
    - 3.19.4.3 Project Segment 3
      - Current Health and Historical Context of Resource 1
      - Current Health and Historical Context of Resource 2
      - Current Health and Historical Context of Resource 3
      - Current Health and Historical Context of Resource N
    - 3.19.4.4 Project Segment N
      - Current Health and Historical Context of Resource 1
      - Current Health and Historical Context of Resource 2
      - Current Health and Historical Context of Resource 3
      - Current Health and Historical Context of Resource N

3.19.5 Environmental Consequences
3.19.5.1 Overview
3.19.5.2 Project Segment 1
Alternative 1
Resource 1
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 2
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 3
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource N
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Alternative 2
Resource 1
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 2
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 3
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource N
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Alternative 3
Resource 1
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 2
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 3
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource N
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Alternative N
Resource 1
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 2
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 3
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)

Resource N
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)

3.19.5.3 Project Segment 2

Alternative 1
Resource 1
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 2
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 3
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource N
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)

Alternative 2
Resource 1
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 2
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 3
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource N
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)

Alternative 3
Resource 1
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 2
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 3
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource N
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)

Alternative N
Resource 1
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 2
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 3
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)

Resource N
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
3.19.5.4 Project Segment 3
Alternative 1
Resource 1
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 2
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 3
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource N
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Alternative 2
Resource 1
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 2
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 3
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource N
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Alternative 3
Resource 1
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 2
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 3
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource N
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Alternative N
Resource 1
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 2
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 3
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)

Resource N
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)

3.19.5.5 Project Segment N

Alternative 1
Resource 1
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 2
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 3
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource N
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)

Alternative 2
Resource 1
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 2
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 3
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource N
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)

Alternative 3
Resource 1
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 2
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 3
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource N
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)

Alternative N
Resource 1
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 2
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)
Resource 3
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)

Resource N
Cumulative Impacts
Project Contribution (Short-Term and Long-Term)

3.19.6 Mitigation Measures (for any newly identified significant cumulative impacts)

3.19.6.1 Project Segment 1
Alternative 1
Alternative 2
Alternative 3
Alternative N

3.19.6.2 Project Segment 2
Alternative 1
Alternative 2
Alternative 3
Alternative N

3.19.6.3 Project Segment 3
Alternative 1
Alternative 2
Alternative 3
Alternative N

3.19.6.4 Project Segment N
Alternative 1
Alternative 2
Alternative 3
Alternative N

3.19.7 Impacts Summary

3.19.7.1 Alternative 1
3.19.7.2 Alternative 2
3.19.7.3 Alternative 3
3.19.7.4 Alternative N

4 SECTION 4(f) AND SECTION 6(f) EVALUATIONS

Section 4(f) and Section 6(f) evaluations are required by the U.S. Department of Transportation (U.S. DOT) Act of 1966 and Land and Water Conservation Fund Act of 1965 respectively. The program environmental impact report/environmental impact statement (EIR/EIS) included a broad and general Section 4(f) and Section 6(f) analysis. Each project EIR/EIS will identify any Section 4(f) and Section 6(f) resources in the study area (based on the Cultural Resources, Parks, Biological Resources and Wetlands, and Land Use Sections of the environmental document), and the high-speed rail (HSR) Regional Consultant (RC) will complete detailed Section 4(f) evaluations and initiate the process for securing any needed Section 6(f) conversion approvals. The analysis also will describe prior (i.e., alternatives analysis process) and on-going efforts (i.e., selection of alternatives) to avoid Section 4(f) and Section 6(f) resources.

The following methodology describes the elements of the evaluation and the process to prepare the Section 4(f) and Section 6(f) evaluations. It incorporates the guidance from the Section 4(f) Policy Paper, Federal Highway Administration (FHWA), July 20, 2012, and the requirements codified at 23 U.S.C. § 138 and 49 U.S.C. § 303. Other guidance includes:

- *FHWA Guidance for Preparing and Processing Environmental and Section 4(f) Documentation,* October 30, 1987 (http://environment.fhwa.dot.gov/projdev/impTA6640.asp#f4)
- Caltrans Standard Environmental Reference Volume 1, Chapter 20-Section 4(f)
- FHWA's Section 4(f) Regulations codified at 23 C.F.R. Part 774

The organization of the chapter is based on the Section 4(f) and Section 6(f) Evaluation prepared for the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014). An important part of preparing the Section 4(f) and Section 6(f) evaluation is documenting the on-the-ground conditions and input of the local public agencies. Direction on the role of local public agencies in providing existing conditions information for the EIR/EIS and a reference list of agency types is provided in Section 3.0.10, Outreach to Local Agencies.

Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the chapter. Example text illustrating the various elements in a Section 4(f) and Section 6(f) evaluation is shown in *italics*. The methods are organized to mirror the organization of the EIR/EIS chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

4.1 Introduction

The Introduction provides the context for the Section 4(f) and Section 6(f) evaluations. It identifies the laws, regulations, and orders pertinent to the identification and evaluation of Section 4(f) and Section 6(f) resources, Section 4(f) Applicability, and Section 4(f) use definitions. Specific references will be made to related content in other sections of the EIR/EIS that influence or are influenced by the Section 4(f) evaluation and supportive/associated technical documents. References to other documents must include citations. The following red text can be used to when preparing the Introduction.

This chapter provides the analysis to support the Federal Railroad Administration's (FRA) preliminary determinations to comply with the provisions of 49 U.S.C. § 303 (hereinafter referred to as "Section 4(f)") and the Land and Water Conservation Fund (LWCF) Act of 1965 (hereinafter referred to as "Section 6(f)").

Under Section 4(f), an operating administration of the U.S. DOT may not approve a project that uses protected properties, unless there are no prudent or feasible alternatives to such use, and the project includes all possible planning to minimize harm to such properties. Section 4(f) properties are publicly owned lands of a park, recreation area, or wildlife and water fowl refuge, or a historical site of national, state, or local significance as determined by the federal, state, regional, or local officials having jurisdiction over the resource. To demonstrate FRA's compliance with Section 4(f), this chapter will:

- Describe the statutory requirements associated with Section 4(f)
- Identify the properties protected by Section 4(f) in the study area
- Preliminarily determine whether the [identify appropriate section] HSR project would result in the use of those properties
- Identify feasible and prudent alternatives, to the extent any exist, that would avoid or minimize use of the properties
- Identify measures to minimize harm
- Provide a preliminary least-harm analysis for project alternatives that would result in the use of Section 4(f) properties

Section 6(f) properties are recreation resources created or improved with funds from the LWCF Act. Land purchased with these funds cannot be converted to a non-recreational use without coordination with the U.S. Department of the Interior (DOI) National Park Service (NPS) and mitigation that includes replacement of the quality and quantity of land used. Additional information on publicly owned parks, recreation lands, wildlife and waterfowl refuges, and historic sites and Section 6(f) properties is provided in Section 3.7, Biological Resources and Wetlands; Section 3.15, Parks, Recreation, and Open Space; Section 3.17, Cultural Resources; and the *California High-Speed Rail [insert name] Section: Historic Property Survey Report* (Authority and FRA 201X).

This chapter describes the statutory requirements associated with Section 6(f) and the methodology for identifying Section 6(f) properties and makes a preliminary assessment of impacts on resources protected under Section 6(f).

4.1.1 Laws, Regulations, and Orders

4.1.1.1 Federal

U.S. Department of Transportation Act (23 U.S.C. § 138 and 49 U.S.C. § 303(c)(Section 4(f))

Projects undertaken by an operating administration of the U.S. DOT or that may receive federal funding or discretionary approvals from such an operating administration of U.S. DOT must demonstrate compliance with Section 4(f). Section 4(f) protects publicly owned land of parks, recreational areas, and wildlife refuges. Section 4(f) also protects historic sites of national, state, or local significance located on public or private land. The FRA's *Procedures for Considering Environmental Impacts* (64 C.F.R. Part 25445) contains FRA processes and protocols for analyzing the potential use of Section 4(f) resources. In addition, although not subject to the Title 23 Section 774 regulations regarding Section 4(f) for highways and transit projects, the FRA uses these regulations as additional guidance when applying the requirements established in Section 4(f).

FRA may not approve the use of a Section 4(f) property, as described in 49 U.S.C. § 303(c), unless it determines that there is no feasible and prudent alternative to avoid the use of the property and the action includes all possible planning to minimize harm resulting from such use, or the project has a *de minimis* impact consistent with the requirements of 49 U.S.C. § 303(d).

An alternative is not feasible if it cannot be built as a matter of sound engineering judgment. In determining whether an alternative is prudent, the FRA may consider if the alternative will result in any of the following:

- Compromise the project to a degree that is unreasonable for proceeding with the project in light of its stated purpose and need
- Unacceptable safety or operational problems
- After reasonable mitigation, the project results in severe social, economic, or environmental impacts; severe disruption to established communities; severe disproportionate impacts on minority or low-income populations; or severe impacts on environmental resources protected under other federal statutes.
- Additional construction, maintenance, or operational costs of an extraordinary magnitude
- Other unique problems or unusual factors
- Multiple factors that, while individually minor, cumulatively cause unique problems or impacts of extraordinary magnitude

If FRA determines there is both the use of a Section 4(f) property and that there is no prudent and feasible alternative to the use of a Section 4(f) resource, FRA must ensure the project includes all possible planning (including concurrence of the property owner for any affected historic resources) to minimize harm to the property, which includes all reasonable measures to minimize harm or mitigate impacts (49 U.S.C. § 303(c)(2)).

After making a Section 4(f) determination and identifying the reasonable measures to minimize harm, if there is more than one alternative that results in the use of a Section 4(f) property, FRA must also compare the alternatives to determine which alternative has the potential to cause the least overall harm in light of the preservationist purpose of the statute. The least overall harm may be determined by balancing the following factors:

- The ability to mitigate adverse impacts on each Section 4(f) property (including any measures that result in benefits to the property)
- The relative severity of the remaining harm—after mitigation—to the protected activities, attributes, or features that qualify each Section 4(f) property for protection
- The relative significance of each Section 4(f) property
- The views of the official(s) with jurisdiction over each Section 4(f) property
- The degree to which each alternative meets the purpose and need for the project
- After reasonable mitigation, the magnitude of any adverse impacts on resources not protected by Section 4(f)
- Substantial differences in costs among the alternatives

Section 6(f) of the Land and Water Conservation Fund Act (16 U.S.C. § 460l-8(f) and 36 C.F.R. Part 59.1)

State and local governments often obtain grants through the LWCF Act to acquire or make improvements to parks and recreation areas. Section 6(f) of the act prohibits the conversion of property acquired or developed with these grants to a non-recreational purpose without the approval of NPS. Section 6(f) directs NPS to ensure that replacement lands of comparable value and function, or monetary compensation (used to enhance the remaining land), location, and usefulness are provided as conditions to such conversions.

4.1.2 Study Area

The resource study area (RSA) is the area in which the environmental investigations are conducted to determine the resource characteristics and potential impacts of the project segment. The factors making up the RSA and the description of the elements comprising the RSA (including an illustrative figure) are provided in Section 3.0.4.1, Definition of Resource Study Area, and Section 3.0.4.2, Methodology for Impact Analysis.

The study area as defined below identifies the Section 4(f) and Section 6(f) properties considered for evaluation. Figure 4-X depicts the alternative alignments, stations, and any associated HSR System facilities (e.g., heavy maintenance facilities (HMF)) site alternatives for the [section name] Section of the HSR System.

4.1.2.1 Public Park and Recreation Lands, Open Space, and Wildlife and Waterfowl Refuges

The study area for parks, recreational facilities, and open space is defined as 1,000 feet on either side of the alternative alignments and 0.5 mile around the HMF sites, station areas, and support facilities for the HSR alternatives.

4.1.2.2 Historic Properties

The boundaries of the RSA for historic properties include the project footprint where direct impacts would occur from construction as well as beyond the project footprint(s) to address indirect effects that can occur from changes of use or physical features of a property's setting or the introduction of visual, atmospheric, or audible intrusions. For Section 106 compliance, the term "area of potential effect" (APE) is used for the technical reports that document the identification of historic properties and the assessment of effects. The APE includes national, state, and local historic properties considered significant by the officials having jurisdiction.

Because this project is a federal undertaking, it must also comply with the National Historic Preservation Act (NHPA). The NHPA implementing regulations at 36 C.F.R. Section 800.4(a)(1) require the establishment of an APE. For Section 106 compliance, the APE is used for the technical reports that document the identification of historic properties and the assessment of effects. The APE is the geographic area or areas within which an undertaking may directly or indirectly alter the character or use of historic properties, if any such properties exist. Therefore, the APE serves as the study area for Section 4(f) historic properties that are potentially eligible for listing or are listed on the National Register of Historic Places (NRHP).

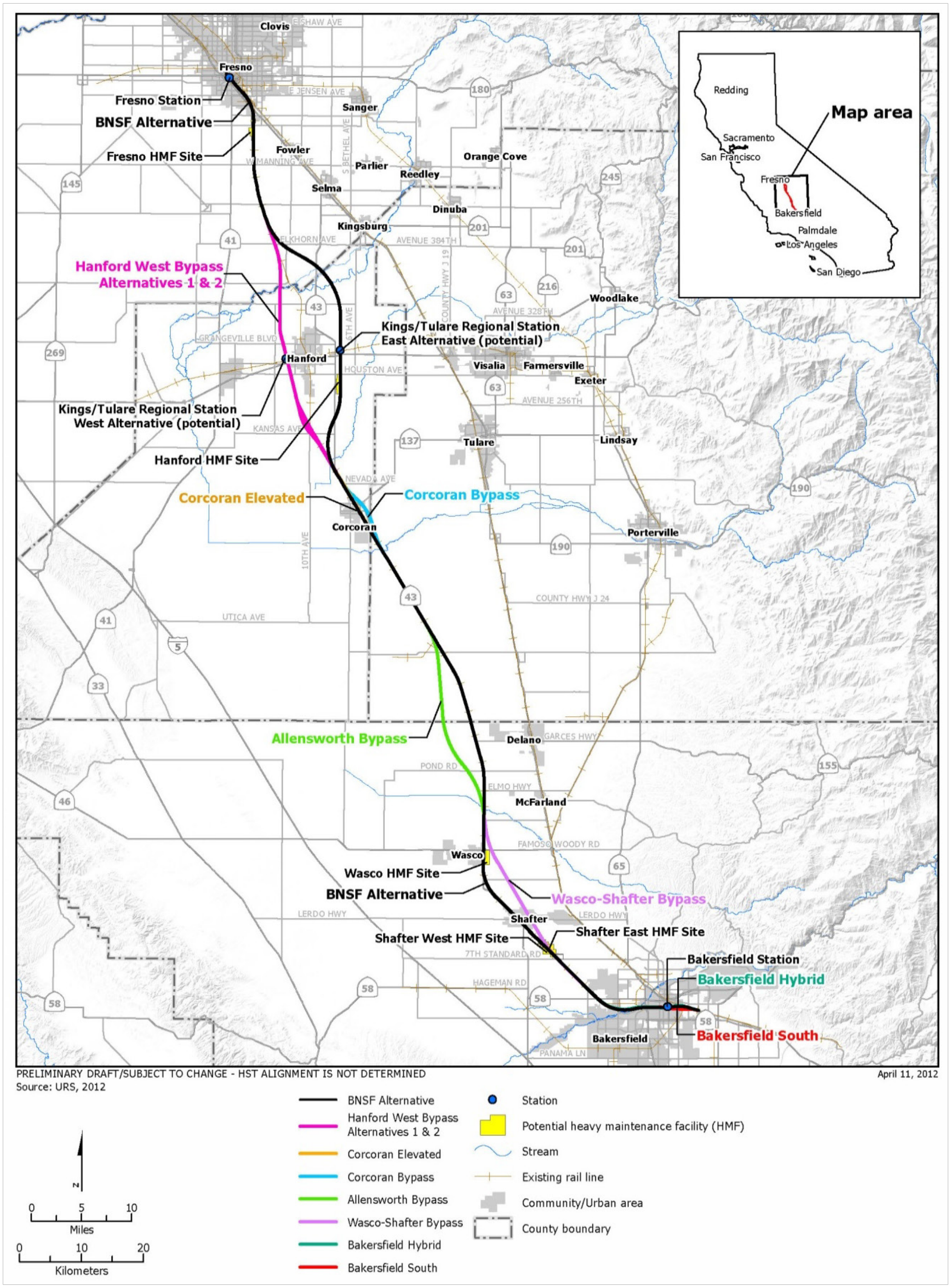

Figure 4-1 HSR Alternatives and HMF Site Alternatives (example only)

The APE for historic architectural properties includes all properties that contain buildings, structures, objects, sites, landscapes, and districts more than 50 years of age at the time the cultural resources survey was conducted. The APE is further defined in Section 3.17, Cultural Resources and includes:

- Properties within the proposed right-of-way
- Properties where historic materials or associated landscape features would be demolished, moved, or altered by construction
- Properties near the undertaking where railroad materials, features, and activities have not been part of their historic setting and where the introduction of visual or audible elements may affect the use or characteristics of those properties that would be the basis for their eligibility for listing in the National Register
- Properties near the undertaking that were either used by a railroad or served by a railroad, or where railroad materials, features, and activities have long been part of their historic setting, but only in such cases where the undertaking would result in a substantial change from the historic use, access, or noise and vibration levels that were present 50 years ago or during the period of significance of a property, if different

4.1.3 Section 4(f) Applicability

A park or recreation area qualifies for protection under Section 4(f) if it (1) is publicly owned at the time at which the "use" occurs, (2) is open to the general public, (3) is being used for recreation, and (4) is considered significant by the authority with jurisdiction.

A wildlife or waterfowl refuge qualifies for protection under Section 4(f) if it (1) is publicly owned at the time at which the "use" occurs, (2) is being used as a refuge, and(3) is considered significant by the authority with jurisdiction.

A historic site eligible for, or listed in, the NRHP is protected under Section 4(f). Although the statutory requirements of Section 106 and Section 4(f) are similar, if a proposed action results in an "adverse effect" under Section 106, there will not automatically be a Section 4(f) "use." To determine whether a use of an NRHP-protected property would occur, FRA completes a separate Section 4(f) analysis and determination, in addition to those completed in compliance with the Section 106 process.

For a property to be eligible for the NRHP, it must meet at least one of the four NRHP criteria (i.e., Criteria A–D) described below. The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the following criteria:

- Criterion A—Properties that are associated with events that have made a significant contribution to the broad patterns of our history
- Criterion B—Properties that are associated with the lives of persons significant in our past
- Criterion C—Properties that embody distinctive characteristics of a type, period, or method of construction; or that represent the work of a master; or that possess high-artistic values; or that represent a significant and distinguishable entity whose components may lack individual distinction
- Criterion D—Properties that have yielded, or may be likely to yield, information important in prehistory or history

An archaeological resource that is eligible only under NRHP Criterion D, as defined above, is considered valuable only in terms of the data that can be recovered from it. For such resources (such as pottery scatters and refuse deposits), it is generally assumed that there is minimal value attributed to preserving such resources in place. Conversely, resources eligible under Criteria A, B, or C, as defined above, are considered to have value intrinsic to the resource's location. In other words, Section 4(f) does not apply to a site if it is important chiefly because of what can be learned by data recovery and has minimal value for preservation in place.

4.1.4 Section 4(f) Use Definition

The term "use" in the Section 4(f) context has very specific meaning. FHWA regulations (23 C.F.R. Part 774.17) contain a helpful definition of the term and the description of any potential use of Section 4(f) property consistent with that definition. Do not substitute similar terminology such as "affected," "impacted," or "encroached upon" in describing when a use occurs, as this may cause confusion or misunderstanding by the reader. The following text can be used to describe the categories of "use" under Section 4(f).

4.1.4.1 Permanent Use

A permanent use of a Section 4(f) resource occurs when property is permanently incorporated into a proposed transportation facility. This might occur as a result of partial or full acquisition, permanent easements, or temporary easements that exceed limits for temporary occupancy as defined below.

4.1.4.2 Temporary Occupancy

A temporary occupancy of a Section 4(f) resource occurs when a temporary action on the property is considered adverse in terms of the preservationist purposes of the Section 4(f) statute. However, a temporary occupancy of property does not constitute a use of a Section 4(f) resource when the following conditions are satisfied:

- The occupancy must be of temporary duration (e.g., shorter than the period of construction) and must not involve a change in ownership of the property
- The scope of work must be minor, with only minimal changes to the protected resource
- There must be no permanent adverse physical impacts on the protected resource or temporary or permanent interference with activities or purpose of the resource
- The property being used must be fully restored to a condition that is at least as good as existed before project construction
- There must be documented agreement of the appropriate officials having jurisdiction over the resource regarding the foregoing requirements

4.1.4.3 Constructive Use

A constructive use of a Section 4(f) resource occurs when a transportation project does not permanently incorporate the property of a protected resource, but the proximity of the project results in impacts (e.g., noise, vibration, visual, access, ecological) that are so severe that the protected activities, features, or attributes that qualify the resource for protection under Section 4(f) are substantially impaired. Substantial impairment occurs only if the protected activities, features, or attributes of the resource are substantially diminished. This determination is made after taking the following steps:

- Identifying the current activities, features, or attributes of the resource that may be sensitive to proximity impacts
- Analyzing the potential proximity impacts on the resource
- Consulting with the appropriate officials having jurisdiction over the resource

It is important to note that erecting a structure over a Section 4(f) property, and thus requiring an air lease, does not, by itself, constitute a use, unless the effect constitutes a constructive use. Further, an indirect adverse effect under Section 106 of the National Historic Preservation Act to a historic property does not in and of itself result in a constructive use.

4.1.4.4 *De minimis* Impact

According to 49 U.S.C. § 303(d), the following criteria must be met to reach a *de minimis* impact determination:

- For parks, recreation areas, and wildlife and waterfowl refuges, a *de minimis* impact determination may be made if FRA concludes the transportation project will not adversely affect the activities, features, and attributes qualifying the property for protection under Section 4(f) after mitigation. In addition, to make a *de minimis* impact determination there must be:
  - Public notice and opportunity for public review and comment
  - Written concurrence on the effect finding is received from the officials with jurisdiction over the property
- For an historic site, a *de minimis* impact determination may be made if, in accordance with the Section 106 process of the NHPA, FRA determines that the transportation program or project will have no effect or no adverse effect on historic properties, FRA has received written concurrence from the official(s) with jurisdiction over the property (e.g., the State Historic Preservation Officer (SHPO)), and has taken into account the views of consulting parties to the Section 106 process as required by 36 C.F.R. Part 800.

4.2 Coordination

49 U.S.C. § 303(b) requires cooperation and consultation with the Secretary of the Interior (and the secretaries of Housing and Urban Development and Agriculture, if appropriate) and the states in the development of transportation projects. Coordination with other entities will be required during the Section 4(f) evaluation to ensure concurrence with the determinations prior to the Section 4(f) approval. Consultation and coordination with the applicable agencies is an extremely important element of the Section 4(f) process. For this reason start consultation efforts as early as possible and thoroughly document to aid in decision making and ensure a complete record.[1] Develop a specific Section 4(f) consultation strategy building upon the RC/Program Management Team (PMT) public involvement plan.

One of the first steps in the Section 4(f) consultation process is identifying the entities and individuals who are considered the officials with jurisdictions for various types of property under Section 4(f). In the case of historic sites, the officials with jurisdiction are SHPO, or, if the property is located on tribal land, the Tribal Historic Preservation Officer.[2] If the property is located on tribal land, but the relevant Indian tribe has not assumed the responsibilities of the SHPO, then a representative designated by the tribe shall be recognized as an official with jurisdiction in addition to the SHPO. When the Advisory Council on Historic Preservation (ACHP) is involved in consultation concerning a property under Section 106 of NHPA (16 U.S.C. § 470), the ACHP is also an official with jurisdiction over that resource for the purposes of Section 4(f). When the Section 4(f) property is a National Historic Landmark, the designated official of the NPS is also an official with jurisdiction over that resource for the purposes of Section 4(f).

[1] See Section 1.2.2 of the FHWA Section 4(f) Policy Paper (July 20, 2012) for more discussion of the consultation process.
[2] *Tribal lands* means all lands within the exterior boundaries of any Indian reservation and all dependent Indian communities (16 U.S.C. § 470w).

In the case of public parks, recreational areas, and wildlife and waterfowl refuges, the officials with jurisdiction are the officials of the agency or agencies that own or administer the property in question and who are empowered to represent the agency on matters related to the property.

The following example text from the *Fresno to Bakersfield Section Final EIR/EIS* can be modified as appropriate to document the coordination conducted during the Section 4(f) evaluation. An example table (*Table 4-1*) also is provided.

> *Consistent with 49 U.S.C. § 303(b) and FRA's Environmental Procedures, copies of the Draft EIS, Supplemental Draft EIS, and this Final EIS have been provided to the Secretary of the Interior, the Secretary of Housing and Urban Development, and the Secretary of Agriculture as well as key state agencies. At key points during the EIR/EIS process, the California High-Speed Rail Authority (Authority) and FRA have consulted with the SHPO, local jurisdictions, the California Department of Fish and Wildlife (CDFW), and the Native American Heritage Commission and interested tribes to identify and assess impacts on Section 4(f) resources. The Authority has consulted with the agencies that have jurisdiction over the public park properties, including the California Department of Parks and Recreation, the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and the cities of Fresno, Corcoran, and Bakersfield, regarding potential park and National Wildlife Refuge impacts. The Authority also consulted with the CDFW regarding impacts on the Allensworth Ecological Reserve. Related coordination activities also occurred throughout the Section 106 of the NHPA and Tribal Consultation process. This coordination is summarized in Section 3.17, Cultural Resources.*
>
> *A preliminary Section 4(f) evaluation was included in both the Draft EIR/EIS and the Revised DEIR/Supplemental DEIS. The Draft EIR/EIS was made available for public review during a 60-day comment period and the Revised DEIR/Supplemental DEIS was made available for public review during a 90-day comment period. FRA and the Authority received comments on the Section 4(f) analysis that were addressed, as appropriate, and reflected in this chapter or included in the response to comments in Volumes IV and V of this Final EIR/ EIS.*
>
> *The Authority and FRA will continue to consult with affected agencies and tribal representatives regarding the effects of the project on the features and attributes of Section 4(f) properties, and provide opportunity for public comment. This is the final Section 4(f) evaluation, and the FRA's Section 4(f) determination will be part of its Record of Decision (ROD).*

Table 4-1 Section 4(f) Evaluation Consultation Summary (example only)

Date	Form	Participants	General Topic(s)

Authority = California High-Speed Rail Authority
FRA = Federal Railroad Administration
U.S. = United States

4.3 Purpose and Need

For the Section 4(f) evaluation, include a restatement of the Purpose and Need as described below.

The purpose of the statewide HSR System is to provide a reliable electric-powered HSR system that links the major metropolitan areas of the state and that delivers predictable and consistent travel times. An additional objective is to provide an interface with commercial airports, mass transit, and the highway network, and to relieve capacity constraints of the existing

transportation system as increases occur in California intercity travel demand, in a manner sensitive to and protective of California's unique natural resources (Authority and FRA 2005).

The purpose of the [insert name of section] Section is to implement the California HSR System between [identify beginning and end points] to provide the public with electric-powered HSR service that provides predictable and consistent travel times between major urban centers and connectivity to airports, mass transit, and the highway network in the [identify region to be served] and to connect the northern and southern portions of the system. For more information on the project objectives and the need for the HSR System in California and in the [identify region to be served] region, refer to Chapter 1.0, Project Purpose, Need, and Objectives.

4.4 Alternatives

Include a summary of the project alternatives in the Section 4(f) evaluation, beginning with the No Project Alternative and then the HSR alternatives. Focus the summary of each alternative on the impacts of each alternative to Section 4(f) and Section 6(f) resources. The following text may be used to introduce the section and describe the No Project Alternative, assuming that any updates or modifications to the No Project Alternative have not occurred.

This section describes the project alternatives, beginning with the No Project Alternative and then the HSR alternatives. The HSR alternatives begin with a single continuous alignment hereinafter termed the [insert name of alternative]. This alternative extends from the northern end of [identify location] to the southern end of [identify location]. This alternative most closely follows the preferred alignment identified in the ROD for the Statewide Program EIR/EIS. [###] alternative alignments deviate from the [name of continuous alignment] for portions of the route. Stations are proposed in the [identify station locations] areas; station alternatives related to their corresponding alignment alternative are discussed below. Additionally, [###] alternative sites are being considered for the HMF (or other related facilities). The project alternatives for the [insert name of section] Section are described in more detail in Chapter 2, Alternatives, and are briefly summarized below. Figure [4-x] through Figure [4-x] show the location of the alternative alignments by project segment.

4.4.1 No Project Alternative

The No Project Alternative considers the effects of growth planned for the region as well a existing and planned improvements to the highway, aviation, conventional passenger rail, and freight rail systems in the [identify section] study area through the 2040 time horizon for the environmental analysis. It does not include construction of the HSR or any associated facilities, and would thus have no impact on any Section 4(f) or Section 6(f) resources; however, there could be impacts to Section 4(f) or Section 6(f) resources as a result of the existing and planned improvements associated with the No Project Alternative. Also, the No Project Alternative would not address the purpose and need for the project. This alternative is insufficient to meet existing and future travel demand; current and projected future congestion of the transportation system would continue to result in deteriorating air quality, reduced reliability, and increased travel times. Because the No Project Alternative does not meet the project purpose and need, it is neither feasible nor prudent and is not discussed further as an avoidance alternative for any Section 4(f) or Section 6(f) resources.

4.4.2 Alternative 1—Alternative N

Summarize each of the project alternatives, including any station sites. Refer to Section 4(f)/6(f) Evaluation (Chapter 4.0) in the *Fresno to Bakersfield Section Final EIR/EIS*, or more recent HSR project EIR/EIS, for guidance on the content and level of detail for these summaries.

4.5 Section 4(f) Applicability Analysis

This section will identify Section 4(f) resources within the study area. The following text can be used to introduce the section.

Section 4.5.1 identifies the park, recreation, open space, and wildlife and waterfowl refuge properties that meet the criteria for protection as Section 4(f) resources. Section 4.5.2 identifies cultural resources that meet the criteria for protection as Section 4(f) resources. All Section 4(f) resources are shown on Figure [4-x] through Figure [4-x], and Table [4-x] and Table [4-x] provide information about the attributes of each of the properties that either have proximity impacts that could result in the potential for a Section 4(f) use (parks, recreational areas, open space, and wildlife and waterfowl refuges) or are located in the cultural resources APE.

Identify Section 4(f) properties as early as practicable in the planning and project development process (i.e., during the alternatives analysis) so that complete avoidance of the protected resources can be given full and fair consideration. Section 4(f) requires consideration of the following properties:

- Parks and recreational areas of national, state, or local significance that are both publicly owned and open to the public
- Publicly owned wildlife and waterfowl refuges of national, state, or local significance that are open to the public to the extent that public access does not interfere with the primary purpose of the refuge[3]
- Historic sites of national, state, or local significance in public or private ownership regardless of whether they are open to the public

In general, Section 4(f) does not apply when private institutions, organizations, or individuals own parks, recreational areas, or wildlife and waterfowl refuges, even if such areas are open to the public. However, in some cases a governmental body might have a permanent proprietary interest in the land (such as a permanent easement or, in some circumstances, a long-term lease). In these cases, FRA will determine on a case-by-case basis whether the particular property should be treated as a Section 4(f) property. Be prepared to provide the legal document conveying the property right to the governmental body (e.g., easement or lease) as well as any other supporting documentation including consultation with the official with jurisdiction where applicable when making this decision. Section 4(f) applies to all historic sites that are listed, or eligible for inclusion, in the NRHP at the local, state, or national level of significance, regardless of whether or not the historic site is publicly owned or open to the public.

For any resources meeting the criteria for protection as Section 4(f) resources that are not described in the relevant EIR/EIS sections, provide the following information:

- A detailed map or drawing of sufficient scale to identify the relationship of the alternatives to the Section 4(f) property
  - Ensure the map boundary does not exceed the extent of the project segment and clearly shows the location and extent of project impacts to the affected Section 4(f) properties.
  - Obtain Authority, FRA, and PMT concurrence on mapping scale before preparing the administrative draft EIR/EIS chapter.
- Size (acres or square feet) and location (maps or other exhibits such as photographs) of the affected Section 4(f) property

[3] Since the primary purpose of a refuge may make it necessary for the resource manager to limit public access for the protection of wildlife or waterfowl, FHWA's policy is that these facilities are not required to always be open to the public. Some areas of a refuge may be closed to public access at all times or during parts of the year to accommodate preservation objectives.

- Ownership (city, county, state, etc.) and type of Section 4(f) property (park, recreation, historic, etc.)
- Function of or available activities on the property (hiking, pedestrian trails, ball playing, swimming, golfing, etc.)
- Description and location of all existing and planned facilities (ball diamonds, tennis courts, etc.)
- Access (pedestrian, vehicular) and usage (approximate number of annual users/visitors, etc.)
- Applicable clauses affecting the ownership, such as lease, easement, covenants, restrictions, or conditions, including forfeiture

Table 4-2 identifies resources that can be used to identify Section 4(f) resources.

Table 4-2 Identifying Section 4(f) Resources

Section 4(f) Resource	Information Sources
▪ Parks, Recreation, and Open Space ▪ Wildlife and Waterfowl Refuges ▪ Cultural Resources ▪ All Section 4(f) Resources	▪ Parks, Recreation, and Open Space EIR/EIS section and technical studies. ▪ Publicly-owned parks and recreation resources (cross-reference parks, recreation, and open space studies) ▪ Biological Resources and Wetlands EIR/EIS section and technical report ▪ Cultural Resources EIR/EIS section and technical reports ▪ Information on Section 4(f) and Section 6(f) properties contained in the Statewide Program EIR/EIS, ROD, and CEQA findings. ▪ Conceptual engineering plans and profiles and temporary easements for the alternative alignments ▪ Project description ▪ Geographic information system data ▪ Information from agencies with jurisdiction over the resources ▪ Consultation with local governments

4.5.1 Parks, Recreation, Open Space, and Wildlife and Waterfowl Refuges

A publicly owned park, recreational area, or wildlife or waterfowl refuge must be a significant resource for Section 4(f) to apply. Resources which meet the definitions are presumed to be significant unless the official with jurisdiction over the site concludes that the entire site is not significant. The FRA will make an independent evaluation to ensure that the official's finding of significance or non-significance is reasonable. In situations where FRA's determination contradicts and overrides that of the official with jurisdiction, the RC must document the rationale for such a determination in the project file and discuss in the EIR/EIS.

The following text and table can be used to identify the existing Section 4(f) properties affected by the HSR project.

Section 3.15, Parks, Recreation, and Open Space, provides a description of each park, recreation, and open space area in the project study area; however, not all of these facilitates meet the requirements to qualify for protection under Section 4(f). A park or recreational area qualifies for protection under Section 4(f) if it (1) is publicly owned at the time at which the "use" occurs,

(2) is open to the general public, (3) is being used for recreation, and (4) is considered significant by the authority with jurisdiction.

The locations of parks, recreation, and open space resources and wildlife refuges in the study area are shown on Figure [4-x] through Figure [4-x]. Data collection to identify potential Section 4(f) resources consisted of a review of the plans and policies listed in Table [3.x-x] of the EIR/EIS Section 3.15, Parks, Recreation, and Open Space, consultation with officials with jurisdiction over resources, field reviews, public input, and the use of geographic information system (GIS) data banks. The cities and counties provided the boundaries for parks and recreation resources located within the study area in GIS data format and in adopted plans.

The following Table 4-3 and text provide an example description of Section 4(f) parks, recreation, open space, and wildlife and waterfowl refuge properties that have the potential to incur a section 4(f) use or are located in close enough proximity to the alignment alternatives to warrant discussion of proximity impacts.

Table 4-3 Parks, Recreation, Open Space, and Wildlife Refuges Evaluated for Section 4(f) Use (example only)

Property Name	Description	Official with Jurisdiction	Alternative Alignment	Distance from Project Footprint (feet)
Father Stephen Wyatt Park	Location: Corcoran Size: 1 acre Features: playground, covered arbor, picnic tables and benches, unlighted softball field	City of Corcoran Department of Public Works	BNSF, Corcoran Elevated	BNSF: 218 Corcoran Elevated: 230

Father Stephen Wyatt Park

Size and Location

Father Wyatt Park, shown on Figure 4-3, is 1 acre in size and is located at 954 Flory Avenue in Corcoran. The park is located east of and adjacent to the BNSF railroad tracks.

Ownership

Father Wyatt Park is owned and maintained by the City of Corcoran.

Usage of Park (Intended, Actual/Current, Planned)

The park is intended to be used as a public recreational facility and offers a playground area, a covered arbor, picnic tables, benches, and an unlighted softball field. The park does not provide any vehicular access; parking is available on side streets adjacent to the park. Pedestrian access is available on all sides of the park; the park boundaries are not fenced. Actual park usage is consistent with its intended use.

Unusual Characteristics Reducing or Enhancing Park Value

The park is directly adjacent to an active railroad corridor and currently experiences noise and visual impacts associated with that corridor as a result of existing freight and passenger (Amtrak) traffic.

4.5.2 Cultural Resources

Initiate the Section 106 process and identify resources listed or eligible for listing in the NRHP early enough in project planning or development to determine whether Section 4(f) applies and for avoidance alternatives to be developed and assessed. The following text can be used to introduce the discussion of cultural resources.

For purposes of identifying cultural resources potentially protected under Section 4(f), the study area is the same as the APE, which is defined in Section 3.17, Cultural Resources. Within the archaeological and historic property APEs, background research and the field survey revealed [##] historic properties listed or eligible for listing in the NRHP that qualify as Section 4(f) resources; these properties are shown on Figure [4-x] through Figure [4-x]. There are [no known or ##] archaeological resources in the study area that qualify as Section 4(f) resources. *Table 4-4* describes resources listed in, or determined or recommended to be eligible for, the NRHP that are located within the cultural resources APE (defined in Section 3.17, Cultural Resources). The APE that the resource is within is identified also in *Table 4-4*.

Table 4-4 Resources Listed in, or Determined or Recommended Eligible for the National Register of Historic Places (example only)

Resource Name	Address	County	Year Built	Current Status Code	HSR Alternative in which property is located in APE
Hotel Fresno	1257 Broadway	Fresno	1912	2S2	BNSF, Fresno Station-Mariposa, Fresno Station-Kern
Crest Theater	1160 Broadway Plaza	Fresno	1948	2S2	Fresno Station—Mariposa
Fresno Fire Department Station No. 3	1406–1430 Fresno St	Fresno	1939	3S2	BNSF, Fresno Station-Mariposa, Fresno Station-Kern
Basque Hotel/EA Walrond Building	1102 F St	Fresno	1922	2S2	BNSF, Fresno Station-Mariposa

Code 1D: District listed in the NRHP
Code 1S: Individual property listed in the NRHP
Code 2D: District determined eligible for the NRHP through Section 106 process
Code 2D2: Individual property determined eligible for NRHP and as a contributor to an NRHP-eligible district
Code 2S2: Individual property determined eligible for the NRHP through Section 106 process
Code 3S2: Recommended eligible for listing in the NRHP as an individual property through survey evaluation

Following the table, prepare brief descriptions of each property as per the example below. Refer to the *Fresno to Bakersfield Section Final EIR/EIS* Section 4(f)/6(f) Evaluation, or more recent HSR project EIR/EIS, for guidance on the content and level of detail for these descriptions.

> *Hotel Fresno: Assessor's Parcel Number (APN) 466-214-01 (1257 Broadway)—The Hotel Fresno is a seven-story steel-frame and concrete-block Classical Revival style building constructed in 1912. The building has been determined eligible for listing in the NRHP under Criterion A for its association with Fresno social life and the local community from 1912 to 1960; and under Criterion C for its Classical Revival architectural style, as the first high-rise building in Fresno, and as an early and important example of the Central Valley work of prominent California architect Edward T. Foulkes.*
>
> *Crest Theater: APN 466-212-12 (1160 Broadway Plaza)—The Crest Theater is a tall, two-story, reinforced-concrete building constructed in 1948. The building is eligible for listing in the NRHP under Criterion C, at the local level, as an important example*

of Moderne style architecture that includes a neon marquee and decorated ticket booth.

Fresno Fire Department Station Number 3: APN 467-065-08T (1406–1430 Fresno Street)—This property includes the main two story Moderne style fire house, as well as a secondary one story shop building that has a similar style Moderne façade. The station was completed in 1939. The buildings have been determined eligible for listing in the NRHP under Criteria A and C because the property is a significant example of a Works Progress Administration project in Fresno, and it is a significant local example of Streamline Moderne architectural style. The property also includes a training tower built in 1952 that is not NRHP eligible.

Basque Hotel/EA Walrond Building: APN 467-062-08 (1102 F Street)—The Basque Hotel is a two-story, L-shaped brick building constructed in 1922. The building is eligible for the NRHP under Criterion A for its significant role in the Basque community in Fresno from the 1920s to the 1960s as a place for Basque immigrants to congregate and maintain their cultural tradition.

4.6 Preliminary Section 4(f) Use Assessment

Apply the Section 4(f) use definitions to each property and discuss whether a use would occur as a result of the project, considering amount of land to be used, facilities and functions affected, noise, and visual per the examples provided below. Where a Section 4(f) property might experience proximity effects as a result of the project, coordinate with the PMT and with FRA to determine if these proximity impacts could result in a constructive use. In these cases, include sufficient analysis and information to determine whether the proximity impacts are so severe that the protected activities, features, or attributes that qualify the resource for protection under Section 4(f) are substantially impaired.

Include the following information in the section:

- Discuss any build alternatives that would not have use of any Section 4(f) or Section 6(f) resources.
- Discuss the results of preliminary coordination with the public official having jurisdiction over the Section 4(f) property and with regional (or local) offices of DOI and, as appropriate, the regional office of NPS and the forest supervisor of the affected national forest. Generally, the coordination should include discussion of avoidance alternatives, impacts to the property, and measures to minimize harm. In addition, the coordination with the public official having jurisdiction should include a discussion of significance and primary use of the property.
- In making any finding of use involving Section 4(f) properties, have up-to-date right-of-way (ownership) information and clearly defined property boundaries for the Section 4(f) properties. For publicly owned parks, recreational areas, and refuges, the boundary of the Section 4(f) resource is generally determined by the property ownership boundary. Up-to-date right-of-way records are needed to ensure that ownership boundaries are accurately documented. This information needs to be confirmed with the public official having jurisdiction. For historic properties, the boundary of the Section 4(f) resource is generally the NRHP boundary and should be consistent with the Section 106 determination of eligibility forms.
- If the historic property boundary of an eligible or listed site has not been previously established via Section 106 consultation, coordinate with the cultural resource specialist to evaluate the site with respect to eligibility criteria and to determine the historic property boundary. Depending upon its contributing characteristics, the actual legal boundary of the property may not ultimately coincide with the NRHP boundary. Should the historic boundary

extend beyond the legal boundary of the property, conduct more detailed preliminary design in areas within the historic boundary so as to finalize determinations of use.

A *de minimis* impact determination is made for the net impact on the Section 4(f) property. The final project NEPA decision document must include sufficient supporting documentation for any measures to minimize harm that were applied to the project by FRA in order to make the *de minimis* impact determination (see 23 C.F.R. Part 774.7(b)). A use of Section 4(f) property having a *de minimis* impact can be approved by FRA without the need to develop and evaluate alternatives that would avoid using the Section 4(f) property. A *de minimis* impact determination may be made for a permanent incorporation or temporary occupancy of a Section 4(f) property.

4.6.1 Park, Recreation, and Wildlife Refuge Resources

The following text can be used to introduce this discussion.

Preliminary use assessments for the park, recreation, and wildlife refuge resources relative to HSR alternatives are discussed in this section. All Section 4(f) properties are shown in Figure [4-x] through Figure [4-x]; however, only those properties that would incur a use, or are in close enough proximity to an alignment alternative as to incur proximity impacts (as listed in Table [4-x]), are described below.

The following example text is from the *Fresno to Bakersfield Section Final EIR/EIS* Section 4(f)/6(f) Evaluation. Use figures to illustrate project impacts wherever use is determined.

4.6.1.1 Father Stephen Wyatt Park Use Assessment

BNSF Alternative and Corcoran Elevated Alternative

Differences in impacts on Father Wyatt Park are negligible under the BNSF Alternative and the Corcoran Elevated Alternative. Thus, the following discussion applies to both alternatives.

Neither the BNSF Alternative nor the Corcoran Elevated Alternative would permanently acquire land from Father Wyatt Park and therefore neither alternative would result in a permanent use of this park. Similarly, neither alternative would require temporary physical occupation of Father Stephen Wyatt Park, so there would be no temporary occupancy. However, both alternatives would require some construction activities within 300 feet of the park, including its publicly used recreational facilities (playground, arbor, picnic tables, benches, and softball field). Evaluation of the proximity impacts shows there would be increases in noise and dust levels that would be noticeable to park users during construction-related activities. While these impacts could potentially be considered a nuisance to park users, they would be temporary in nature. Trees located north and west of Father Wyatt Park and would shield park users from visual impacts during construction under both alternatives. Access to the park would be maintained throughout construction. Construction of these alternatives would not prevent public use of the park nor substantially impair use of the playground, arbor, picnic tables, benches, and softball field.

Noise impacts related to operation of the HSR under both the BNSF Alternative and Corcoran Elevated Alternative would be minimal. Portions of the park that are used for recreation are subjected to freight train noise on a daily basis, with an existing ambient noise level of 80.7 day/night average sound level (L_{dn}). As described in Section 3.4, Noise and Vibration, introduction of the HSR at this location would only increase ambient noise levels to 81.0 L_{dn}, a negligible increase that would not be evident to park users. In addition, with respect to potential visual impacts during operation the existing trees to the north and west would block views of the HSR from park users. Therefore, because no park property would be acquired and the

noise and visual impacts from the HSR would not impair the use of the park, there would be no Section 4(f) use under either alternative.

4.6.2 Cultural Resources

The following text can be used to introduce this discussion.

Section 106 of the NHPA requires federal agencies to consider a project's effect on cultural resources in much the same way as Section 4(f). The most important connection between the two statutes is that the Section 106 process is the method by which a cultural resource's significance and any resulting protections are determined under Section 4(f).

The results of the Section 106 process determine whether Section 4(f) applies to historic properties. The results of the Section 106 analysis are critical in determining the applicability and outcome of the Section 4(f) evaluation. The most important difference between the two statutes is the way each of them measures impacts on cultural resources. Whereas Section 106 is concerned with "adverse effects," Section 4(f) is concerned with "use" of protected properties. An adverse effect does not necessarily result in a Section 4(f) use unless the effect substantially impairs the attributes and features that qualify the resource for protection under Section 4(f).

Section 4(f) historic properties were evaluated by (1) identifying if the project would permanently incorporate land from the property and (2) reviewing the effects on the property as documented during the Section 106 process. If an alternative would permanently incorporate land from the property or result in an adverse temporary occupancy (i.e., does not meet the criteria of Section 4.1.4.2) and would also result in an "adverse effect," this impact would constitute a Section 4(f) use. If the project would result in a permanent incorporation or temporary occupancy that does not meet the criteria to avoid "use," then the impact would be "use" absent a *de minimis* determination based on SHPO concurrence on a no adverse effects determination.

4.6.2.1 Preliminary Section 4(f) Use Determinations at Historic Sites with Direct Adverse Effects under Section 106

Based on the analysis conducted for cultural resources (see Section 3.17), the following [##] NRHP-listed or eligible historic sites would be directly adversely affected under Section 106 by one or more HSR alternatives. These properties have been preliminarily determined to incur Section 4(f) uses because these sites would be permanently incorporated into the HSR right-of-way.

The following example text is from the *Fresno to Bakersfield Section Final EIR/EIS,* Section 4(f)/6(f) Evaluation.

Washington Irrigated Colony Historic Rural Landscape (Rural Fresno County)

BNSF Alternative

A Section 4(f) use of the Washington Irrigated Colony Historic Rural Landscape would occur under the BNSF Alternative as a result of direct adverse effects to properties that contribute to the district, including the Washington Colony Canal and the North Branch of the Oleander Canal as discussed further below. The BNSF Alternative would have no adverse effect on 6422 South Maple Avenue (eligible both individually and as a contributing element to the Washington Irrigated Colony Historic Rural Landscape) under Section 106.

Washington Colony Canal (Rural Fresno County)—The BNSF Alternative would cross this canal at-grade. This would result in the placement of culvert crossings within the physical boundary of the historic property, permanently converting land into a transportation feature and therefore resulting in a Section 4(f) use. Impacts would be limited to the portion of the canal crossed by the BNSF Alternative and would not extend to other historic portions of the canal.

North Branch of the Oleander Canal (Rural Fresno County)—The BNSF Alternative would cross this canal at-grade. This would result in the placement of culvert crossings within the physical boundary of the historic property, converting land into a transportation feature and therefore resulting in a Section 4(f) use. Impacts would be limited to the portion of the canal crossed by the BNSF Alternative and would not extend to other historic portions of the canal.

4.6.2.2 Preliminary Section 4(f) Use Determinations at Historic Sites with Indirect Adverse Effects under Section 106 of the NHPA

The [##] historic properties listed below were analyzed to determine whether the project alternatives could result in indirect adverse effects. Section 4(f) use determinations are based on analyzing the potential proximity impacts on the properties, taking into account the activities, features, or attributes that qualify the property for protection under Section 4(f). A finding of indirect adverse effect does not automatically result in a Section 4(f) use. Where there is the potential for an indirect adverse effect on a protected property, FRA completes a property-specific evaluation to determine whether the adverse effects will substantially impair the attributes that qualify this resource for protection under Section 4(f).

- If the effects substantially impair the attributes, then there is a 4(f) use.
- If it does not substantially impair the attributes and no property is going to be permanently incorporated, then there is no use under 4(f).
- If it does not substantially impair the attributes and property is going to be permanently incorporated, then the impacts should be considered *de minimis*. Supporting documentation for either of the above evaluations must be included in the record.

The following example text is from the *Fresno to Bakersfield Section Final EIR/EIS* Section 4(f)/6(f) Evaluation.

Southern Pacific Railroad Depot (1033 H Street, Fresno)

BNSF Alternative

No HSR alternative would result in a Section 4(f) use of property of the NRHP-listed Southern Pacific Railroad Depot site based on acquisition or occupancy of the property. However, the BNSF Alternative would result in a Section 106 indirect adverse effect on the Southern Pacific Railroad Depot because the new station would change the character of the Depot's use. The property's setting, feeling, and association, which contribute to its historic significance, and the operation of the new station would introduce a visual impact that reduces the integrity of the property's historic features and historic use.

The BNSF Alternative would include construction of a Tulare Street overcrossing adjacent to the southern side of the Southern Pacific Railroad Depot in Fresno. The size, scale, and mass of this elevated structure are larger than the original depot design layout; however, although the new transportation features would be visible within the viewshed of the property, they would not detract from the character-defining features of historic depot's architectural style or change the character of the property's use. Therefore, the BNSF Alternative would not result in a substantial impairment of the attributes that qualify this resource for protection under Section 4(f). Therefore, the assessment is that it would not constitute a Section 4(f) use.

4.6.2.3 Summary of Preliminary Section 4(f) Use Determinations of Historic Properties

The following text can be used to introduce this discussion.

A summary of Section 4(f) uses of NRHP-listed or eligible historic properties is provided in Table 4-5. In some cases historic properties are located within the alignment of more than one alternative. Direct and constructive preliminary Section 4(f) use determinations are included in the table.

Table 4-5 Summary of Section 4(f) Uses of National Register of Historic Places-Listed or Eligible Properties (example only)

Alternative	Number of Historic Property Uses	Historic Property Uses
Areas with no Corresponding Alternative		
BNSF	2	Washington Irrigated Colony Historic Rural Landscape Washington Colony Canal North Branch of Oleander Canal
Hanford Area		
BNSF	1	People's Ditch
Hanford West Bypass 1	2	Last Chance Ditch 9860 13th Avenue
Hanford West Bypass 2	2	Last Chance Ditch 9860 13th Avenue

4.7 Avoidance Alternatives

Avoidance Alternatives Analysis will only be conducted for non-*de minimis* Section 4(f) resources. When a use of Section 4(f) property by any of the build alternatives is anticipated, identify and evaluate location and design alternatives that would minimize impacts or avoid the Section 4(f) and Section 6(f) resources. Show the locations of the Section 4(f) properties in relation to the proposed avoidance alternative. Where an alternative would use land from more than one Section 4(f) property, evaluate alternatives which avoid or have reduced use of each Section 4(f) property (23 C.F.R. Part 771.135(i)). The design alternatives should be in the immediate area of the property and consider minor alignment shifts, a reduced facility, retaining structures, noise walls, etc., individually or in combination, as appropriate.

The environmental and engineering teams for each HSR section will need to work together during the alternatives development process to identify properties that could be subject to Section 4(f) so as to consider design avoidance alternatives early in the process at a level that is sufficient for impact analysis. It will also be necessary to describe reasons why some alternatives are not feasible or prudent. Also, if a Section 6(f) property is required, a replacement property, if any, must be of at least equal value, be of reasonably equivalent usefulness and location to that being converted, and meet the eligibility requirements for LWCF assisted acquisition.

Potential alternatives to avoid the use of Section 4(f) property may include one or more of the following, depending upon project context:

- Location Alternatives—A location alternative refers to the re-routing of the entire project along a different alignment.
- Alternative Actions—An alternative action could be a different mode of transportation, such as rail transit or bus service, or some other action that does not involve construction, such as the implementation of transportation management systems or similar measures.
- Alignment Shifts—An alignment shift is the re-routing of a portion of the project to a different alignment to avoid a specific resource.
- Design Changes—A design change is a modification of the proposed design in a manner that would avoid impacts.

An important consideration in identifying potential avoidance alternatives is that they meet the project purpose and need. Another limitation in identifying potential avoidance alternatives is that a project alternative that avoids one Section 4(f) property by using another Section 4(f) property is not an avoidance alternative. Once the potential avoidance alternative(s) have been identified, the next task is to determine whether avoiding the Section 4(f) property is feasible and prudent. A "feasible and prudent avoidance alternative" is one that avoids using Section 4(f) property and does not cause other severe problems of a magnitude that substantially outweigh the importance of protecting the Section 4(f) property.

A potential avoidance alternative is not feasible if it cannot be built as a matter of sound engineering judgment (23 C.F.R. Part 774.17). In this case the particular engineering problem with the alternative should be documented in the project files with a reasonable degree of explanation. An alternative is not prudent if it meets one or more of the following factors:

- It does not address the purpose and need of the project
- It results in unacceptable safety or operational problems
- After reasonable mitigation it still causes severe social, economic, or environmental impacts; severe disruption to established communities; severe or disproportionate impacts to minority or low-income populations; or severe impacts to environmental resources protected under other federal statutes
- It results in additional construction, maintenance, or operational costs of extraordinary magnitude
- It causes other unique problems or unusual factors
- It involves multiple factors as outlined above that, while individually minor, cumulatively cause unique problems or impacts of extraordinary magnitude

The prudence determination involves an analysis that applies each of the six factors, if applicable. If a factor is not applicable it should be noted in the analysis concluding whether there is a prudent alternative, which can be applied to similar situations with other HSR sections as detailed below.

Following is text from the *Fresno to Bakersfield Section Final EIR/EIS* Section 4(f)/6(f) Evaluation that can be tailored to discuss avoidance alternatives.

Section 4(f) requires the selection of an alternative that avoids the use of Section 4(f) property if that alternative is deemed feasible and prudent. The purpose and need statement of the HSR [name of section] Section EIR/EIS tiers off the approved program EIR/EIS documents. The alternatives evaluation process conducted as part of the HSR project for the [name of section] Section concluded that there was no feasible and prudent HSR alternative within the study area that did not result in a use of a Section 4(f) resource. Although the alternatives analysis process

considered multiple criteria, the screening emphasized the project objective to maximize the use of existing transportation corridors and available rights-of-way, to the extent feasible; the result of this was the carrying forward of the north-south alignment alternatives that follow the existing [identify rail corridor]. The alternatives evaluation process resulted in the conclusion that, in accordance with 49 U.S.C. § 303(c), there was no feasible and prudent HSR alternative within the study area that, based on multiple factors that are individually not severe, would cumulatively result in conditions rendering the alternative not prudent.

The reason for this finding is as follows:

- All HSR alternatives were designed to follow existing railroad corridors to the extent allowed by design speeds. Locating the HSR alignment along these corridors is an objective of the project intended to minimize impacts on the natural and human environment. Any alternative that did not follow these or other transportation corridors would substantially increase the number of displacements, overall community disruption, adverse impacts on natural environment resources, and adverse social and economic impacts.
- Any alternative that did not follow these or other transportation corridors would not meet the purpose and need of the [name of section] HSR Project because such an alternative would fail to link the major metropolitan areas of the state, deliver predictable and consistent travel times, and relieve capacity constraints of the existing transportation system as increases in intercity travel demand in California occur, in a manner sensitive to and protective of California's unique natural resources:
  - Scoping comments brought up alternatives that were already considered in the 2005 Final Statewide Program EIR/EIS, such as the [identify alternatives]. The [name] Alternative was already eliminated in the Program EIR/EIS due to lack of connectivity with urban centers, inability to generate adequate revenue, and high environmental impacts.
  - [Identify and discuss any other alignments that were considered and rejected]

The No Project Alternative would not include the construction of the HSR project or any associated facilities and would thus have no impact on any Section 4(f) or Section 6(f) resources associated with the construction and operation of the HSR. However, there could be impacts to Section 4(f) or Section 6(f) resources as a result of the existing and planned improvements associated with the No Project Alternative. This alternative would not address the state's purpose and need for the project. This alternative is insufficient to meet existing and future travel demand; current and projected future congestion of the transportation system would continue to result in deteriorating air quality, reduced reliability, and increased travel times. Because the No Project Alternative does not meet the project purpose and need, it is neither feasible nor prudent and is not discussed further as an avoidance alternative for any Section 4(f) or Section 6(f) resources.

Greater detail on alternatives considered but dismissed is provided in Section 2.3, and in the *Final Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Proposed California High-Speed Train System* (Authority and FRA 2005), the [name of section] *Preliminary Alternatives Analysis Report* (Authority and FRA 2010a), the [name of section] *Supplemental Alternatives Analysis Report* (Authority and FRA 2010b), and the [name of section] Section: *Checkpoint B Summary Report and attachments* (Authority and FRA 2011b), available at www.hsr.ca.gov/.

4.7.1 Preliminary Individual Resource Avoidance Assessments

Following is example text from the *Fresno to Bakersfield Section Final EIR/EIS* Section 4(f)/6(f) Evaluation. Use figures to illustrate avoidance alternatives.

4.7.1.1 Washington Irrigated Colony Historic Rural Landscape, Washington Colony Canal and North Branch of Oleander Canal

The Washington Irrigated Colony Historic Rural Landscape contains two contributing features that would be used by the BNSF Alternative: the Washington Colony Canal and the North Branch of the Oleander Canal, which are oriented generally east-west across the study area between SR 41 on the west and SR 99 on the east. As the Fresno to Bakersfield Section travels north-south, to avoid these resources it would be necessary to reroute the alignment at least 2 miles away from the BNSF Railway tracks to the east or west to avoid these canals. Because the curve radius for the proposed HSR varies from approximately 4 to 6.5 miles, it would be necessary to reroute at least 6 miles of the alignment, resulting in higher construction and right-of-way costs and a minor increase in travel times. This rerouting would take place across an area of intensive farming, potentially resulting in severe disruption of existing farm operations, for example, due to severance of a parcel by the project footprint that would create two parcels and result in remnant parcel(s) that would be too small or too physically constrained to be farmed economically.

The HSR alignment would permanently incorporate portions of these linear historic properties. However, the alignment would not require a complete demolition of the canals as a whole. With implementation of the measures to minimize harm discussed in Section 4.8, the alignment would not compromise the rural landscape's overall NRHP-eligibility and would not compromise the integrity of the canals as contributing elements to the Washington Irrigated Colony. Therefore, the assessment is that the BNSF Alternative would result in a Section 4(f) use of the Washington Irrigated Colony Historic Rural Landscape and its two contributing features, the Washington Colony Canal and the North Branch of the Oleander Canal; there is no feasible and prudent avoidance alternative to such use.

4.8 Measures to Minimize Harm

Discuss all feasible measures to minimize the impacts of the proposed action on the Section 4(f) property(ies) if there are no prudent and feasible avoidance alternatives. Reference and summarize detailed discussions of mitigation measures in the EIR/EIS. If the potential impacts have been reduced to a *de minimis* level and the agency with jurisdiction concurs (official with jurisdiction for parkland and wildlife refuges; SHPO for historic resources), FRA will make a *de minimis* determination and this is reported in the Project EIS/EIR. This completes the Section 4(f) process for that property. Where Section 6(f) land is involved, summarize the NPS position on land transfers and include a copy of the NPS letter.

The following text can be used to introduce measures to minimize harm.

Measures to minimize harm include measures that were taken during project planning to avoid or minimize impact as well as mitigation and enhancement measures to compensate for unavoidable project impacts. Table [4-x] lists the preliminary measures identified by FRA and the Authority to minimize harm, as required by 49 U.S.C. § 303(c)(2), which will be incorporated into the project to address the impacts of the alternative alignments. Additionally, avoidance alternatives have been developed to avoid uses to Section 4(f) properties where possible, as described in Section 4.7, Avoidance Alternatives, and coordinated with the officials with jurisdiction over the resource. The FRA and the Authority are continuing ongoing coordination, as appropriate, with these officials; during FRA's consideration of its decision and during final design, additional measures may be agreed on to further reduce potential impacts on Section 4(f) properties.

For effects on historic properties, the Programmatic Agreement among the SHPO, ACHP, the Authority, and FRA outlines an approach for compliance with Section 106 of the NHPA. A

Memorandum of Agreement (MOA) that is under development for the [name of section] Section will address the treatment of adverse effects on the built environment from the proposed HSR alignment. The MOA will stipulate which treatment measures will be applied to which cultural resources and that the treatments will be described in the Built Environment Treatment Plan (BETP). The BETP will define the process by which these treatment measures will be applied to each identified resource. Proposed measures to minimize harm for all historic properties are listed together in Table [4-x], measures pertaining to each individual historic property are outlined in Section 3.17, Cultural Resources. As described, the project includes all possible planning to minimize harm to Section 4(f) properties resulting from use, as required by 49 U.S.C. § 303(c)(2).

General measures that would minimize harm to all potentially affected properties as a result of noise or visual intrusion are listed in Section 3.4, Noise and Vibration, and Section 3.16, Aesthetics and Visual Resources. While these measures would apply to all discussed Section 4(f) resources, they are not repeated in *Table 4-6*.

Table 4-6 Measures to Minimize Harm (example only)

Impact(s)	Measures to Minimize Harm
Allensworth State Historic Park (Jurisdiction: State of California Parks and Recreation and SHPO)	
Acquisition of land from park (BNSF Alternative only) Temporary construction activities in the park (BNSF Alternative only)	▪ Final design will continue to minimize right-of-way impacts in Allensworth State Historic Park. Acquisition of Allensworth State Historic Park land will be pursuant to California Code of Civil Procedure Section 1240 for the permanent use of 1.7 acres of Allensworth State Historic Park. ▪ Mitigation may include providing financial compensation for purchase and development of replacement park property of at least equivalent value with the property acquired or, where appropriate, enhancement of the existing facility. Where applicable, this process will be consistent with Section 6(f) requirements (refer to Section 6.10 Section 6(f)), and provide park enhancement as appropriate. ▪ FRA and the Authority will continue to work with the relevant jurisdictions on the establishment of appropriate compensation in terms of allowance or additional property to accommodate for displaced park use during construction. Options will include preparing a plan for alternative public recreation resources during the period of closure and preparing signs and newsletters describing the project, its schedule, and alternative public recreational opportunities.

BETP = Built Environment Treatment Plan
HABS/HAER = Historic American Building Survey/Historic American Engineering Report
HPSR = Historic Property Survey Report
MOA = Memorandum of Agreement
NPS = National Park Service
NRHP = National Register of Historic Places
OHP/SHPO = (California) Office of Historic Preservation/State Historic Preservation Office(r)
PA = Programmatic Agreement

4.9 Preliminary Section 4(f) Least Harm Analysis

When there is no feasible and prudent avoidance alternative to using Section 4(f) resources, FRA must approve the alternative that causes the least overall harm to Section 4(f) resources, taking into consideration the preservation purpose of the statute. In order to ascertain which alternative that uses Section 4(f) properties would cause the overall least harm, FRA considers the following seven factors:

- Ability to mitigate adverse impacts on each Section 4(f) property (including any measures that result in benefits to the property)
- Relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection
- Relative significance of each Section 4(f) property
- Views of the official(s) with jurisdiction over each Section 4(f) property
- Degree to which each alternative meets the purpose and need for the project
- After reasonable mitigation, the magnitude of any adverse impacts on resources not protected by Section 4(f)
- Substantial differences in costs among the alternatives

The first four factors relate to the net harm that each alternative would cause to Section 4(f) property, and the remaining three factors take into account concerns with the alternatives that are not specific to Section 4(f).

The draft Section 4(f) evaluation is required to disclose the various impacts to the different Section 4(f) properties thereby initiating the balancing process. It should also disclose the relative differences among alternatives regarding non-Section 4(f) issues such as the extent to which each alternative meets the project purpose and need. Preliminary assessment of how the alternatives compare to each other may also be included. After circulation of the draft Section 4(f) evaluation in accordance with 23 C.F.R. Part 774.5(a), FRA will consider comments received on the evaluation and finalize the comparison of all factors listed in 23 C.F.R. Part 774.3(c)(1) for all the alternatives. Document the analysis and identification of the alternative with the least overall harm in the final Section 4(f) evaluation.

Use a table to consider and balance the seven factors. The example provided on the following pages is an excerpt from the *Fresno to Bakersfield Section Final EIR/EIS* Section 4(f)/6(f) Evaluation.

4.9.1 Least Harm Analysis for Hanford Area Alternatives

There are no feasible and prudent alternatives to the use of 4(f) properties for the BNSF Alternative (east of Hanford), Hanford West Bypass 1 and 2 alternatives, and Hanford West Bypass 1 and 2 Modified alternatives. Because all alternatives in this portion of the Fresno to Bakersfield Section will result in a Section 4(f) use, FRA has completed the following least-harm analysis. Table 4-7 shows the Section 4(f) property that would incur a use as a result of the BNSF Alternative-Hanford East, Hanford West Bypass-1 and Hanford West Bypass-2 alternatives and characterizes each alternative using the seven Least Harm Analysis factors.

Table 4-7 Preliminary Least Harm Analysis for BNSF-Hanford East Alternative and Hanford West Bypass Alternatives (example only)

Least Harm Factor	BNSF-Hanford East	Hanford West Bypass 1	Hanford West Bypass 2
Section 4(f) property(ies) incurring a use	Use of one Section 4(f) property People's Ditch: reroute ~1,000 feet of historic canal	Use of two Section 4(f) properties Last Chance Ditch: reroute ~1 mile of canal 9860 13th Avenue: Demolition of structure	Use of two Section 4(f) properties Last Chance Ditch: reroute ~1 mile of canal 9860 13th Avenue: Demolition of structure
Factor 1: "The ability to mitigate adverse impacts on each Section 4(f) property (including any measures that result in benefits to the property)"	Peoples Ditch: Canal impact would be mitigated in a similar manner under all alternatives; remaining canal segments would retain integrity	Last Chance Ditch: Canal impact would be mitigated in a similar manner under all alternatives; remaining canal segments would retain integrity 9860 13th Avenue: Impacts cannot be mitigated for demolished structure	Last Chance Ditch: Canal impact would be mitigated in a similar manner under all alternatives; remaining canal segments would retain integrity 9860 13th Avenue: Impacts cannot be mitigated for demolished structure
Factor 2: "The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection."	Peoples Ditch: Unaffected canal segments would retain integrity	Last Change Ditch: Unaffected canal segments would retain their integrity 9860 13th Avenue: Mitigation would not reduce overall harm to the other three structure, as it would be demolished	Last Chance Ditch: Unaffected canal segments would retain their integrity 9860 13th Avenue: Mitigation would not reduce overall harm to structure as it would be demolished

Table 4-7 Preliminary Least Harm Analysis for BNSF-Hanford East Alternative and Hanford West Bypass Alternatives (example only) (continued)

Least Harm Factor	BNSF-Hanford East	Hanford West Bypass 1	Hanford West Bypass 2
Factor 3: "The relative significance of each Section 4(f) property"	People's Ditch: This property is significant due to its association with the agricultural settlement pattern in the Mussel Slough region circa 1870s as a result of local pioneering canal systems and its association with the Mussel Slough Tragedy in 1880. The significance of this property is similar to that of Last Chance Ditch, which is also significant for its association with these same events.	Last Chance Ditch: This property is significant due to its association with the agricultural settlement pattern in the Mussel Slough region circa 1870s as a result of local pioneering canal systems and its association with the Mussel Slough Tragedy in 1880. The significance of this property is similar to that of Peoples Ditch, which is also significant for its association with these same events. 9860 13th Ave: This historic property is significant because it is being recommended as eligible for inclusion on the NRHP for its association with settlement of the Mussel Slough area and as a significant local example of folk Queen Anne architecture.	Last Chance Ditch: Last Chance Ditch: This property is significant due to its association with the agricultural settlement pattern in the Mussel Slough region circa 1870s as a result of local pioneering canal systems and its association with the Mussel Slough Tragedy in 1880. The significance of this property is similar to that of Peoples Ditch, which is also significant for its association with these same events. 9860 13th Ave: This historic property is significant due because it is being recommended as eligible for inclusion on the NRHP for its association with settlement of the Mussel Slough area and as a significant local example of folk Queen Anne architecture.
Factor 4: "The views of the official(s) with jurisdiction over each Section 4(f) property"	SHPO concurred with the NRHP eligibility of the canal on February 6, 2012. SHPO concurred with the findings regarding effects on the canal pursuant to Section 106 of the NHPA on December 13, 2013.	SHPO concurred with the NRHP eligibility of the canal on April 2, 2013. The effect to the canal pursuant to Section 106 of the NHPA is pending. SHPO concurred with the NRHP eligibility of the historic structure on April 2, 2013.	SHPO concurred with the NRHP eligibility of the canal on April 2, 2013. The effect on the canal pursuant to Section 106 of the NHPA is pending. SHPO concurred with the NRHP eligibility of the historic structure on April 2, 2013.
Factor 5: "The degree to which each alternative meets the purpose and need for the project"	Meets the project purpose and need; highest travel time (8 minutes and 17 seconds)	Meets the project purpose and need; lower travel time than BNSF Alternative, higher than Hanford West Bypass 2 Alternative (8 minutes and 2 seconds) This alternative would not connect to the Preferred Alternative in Corcoran	Meets the project purpose and need; lowest travel time (7 minutes and 43 seconds)

Table 4-7 Preliminary Least Harm Analysis for BNSF-Hanford East Alternative and Hanford West Bypass Alternatives (example only) **(continued)**

Least Harm Factor	BNSF-Hanford East	Hanford West Bypass 1	Hanford West Bypass 2
Factor 6: "After reasonable mitigation, the magnitude of any adverse impacts on resources not protected by Section 4(f)"[1]	▪ Greatest impact on important agricultural land (1,203 acres) ▪ Most modifications of confined animal facilities (seven dairies) ▪ Least impact on wetlands (0.01 acre) ▪ Moderate impact on other waters of the U.S. (26.31 acres); similar to Hanford West Bypass 1 and Hanford West Bypass 1 Modified; less than Hanford West Bypass 2 and Bypass 2 Modified ▪ Least impact on riparian areas (1.37 acres) ▪ Least impact to natural habitat that could support special-status species (e.g., annual grassland, pasture) (38.87 acres) ▪ Greatest number of relocations (52 residences)	▪ Least impact on important agricultural land (834 acres) ▪ Less impact on confined animal facilities than Hanford West Bypass 1 Modified, Hanford West Bypass 2, and Hanford West Bypass 2 Modified; less than BNSF-Hanford East (closure of one and modification of two dairies) ▪ Greatest impacts on wetlands (0.46 acre) ▪ Impacts 24.76 acres of other waters of the U.S. (second fewest); much lower than Hanford West Bypass 2 and Bypass 2 Modified ▪ Impacts moderate amount of riparian areas (2.32 acres); similar impact as Hanford West Bypass 2	▪ Less impact on important agricultural land than Hanford West Bypass Modified 1 and Hanford West Bypass 2 Modified (847 acres) ▪ Greater modifications of confined animal facilities than Hanford West Bypass 1, Hanford West Bypass 1 Modified, and Hanford West Bypass 2 Modified (three dairies) ▪ Greater impacts on wetlands than all alter-natives but Hanford West Bypass 1 (0.43 acre) ▪ Greater impact on other waters of the U.S. (44.00 acres); less than Hanford West Bypass 2 Modified ▪ Impacts moderate amount of riparian areas (2.32 acres); similar impact as Hanford West Bypass 1
Factor 7: "Substantial differences in costs among the alternatives"	$1,326,000,000	Estimated to cost $368 million less than the BNSF Alternative	Estimated to cost $74M less than the BNSF Alternative

NHPA = National Historic Preservation Act
NRHP = National Register of Historic Places
SHPO = State Historic Preservation Office(r)
[1] A response to address the "magnitude of any impacts to resources not protected by Section 4(f)" ultimately requires a totality of impacts consideration that takes into account the entire spectrum of natural and human resources addressed in this EIR/EIS. This consideration is a task of the decision-makers examining the various technical reports contained in this EIR/EIS. Information by alternative is based on a summary review of the EIR/EIS. Because the Hanford West Avoidance Alternative was not studied in detail in this EIR/EIS, GIS data was reviewed for a hypothetical footprint extending 50 feet on either side of the potential centerline as this alternative.

Following the table, compare the alternatives based on the consideration of the seven factors. Example text below is from the *Fresno to Bakersfield Section Final EIR/EIS* Section 4(f)/6(f) Evaluation.

> *Based on the analysis of the factors contained in Table 4-7 and in light of the preservationist purpose of Section 4(f), FRA has determined that the BNSF-Hanford East Alternative would result in the least overall harm to properties protected by Section 4(f). All of the alternatives affect canals with a similar level of significance but the Hanford West Bypass 1 and Hanford West Bypass 2 alternatives would also each require demolition of the historic structure at 9860 13th Avenue. Impacts on resources not protected by Section 4(f) vary depending on the resource area, as shown in Table 4-7. The BNSF-Hanford East will result in fewer overall impacts to wetlands, riparian areas, habitat for special-status species, have the fewest noise impacts, and result in the fewest displacements of commercial and industrial properties.*
>
> ***Net Harm to Section 4(f) Property***
>
> *Factors 1 through 4 in Table 4-7 consider the net harm that each alternative would cause to Section 4(f) properties.*
>
> *The Hanford West Bypass 1 and Hanford West Bypass 2 would result in greater net harm to Section 4(f) resources because unlike the BNSF-Hanford East they require the demolition the historic structure at 9860 13th Avenue. The historic structure is eligible for the NRHP for its association with pioneering agricultural settlement of the area and as a significant local example of folk Queen Anne style architecture. Mitigation would not reduce the overall harm to the structure because it would be demolished. The BNSF-Hanford East would not affect any portion of this property but like the other alternatives would impact a historic ditch.*
>
> *Under all three alternatives, historic ditches would be adversely affected. The historic ditches are eligible for the NRHP and are commensurate in overall significance because all are eligible for their association with the development of the area and their association with the Mussel Slough Tragedy of 1880. Appropriate mitigation will be implemented and the remaining sections of the ditches would retain integrity. However, the Hanford West Bypass 1 and 2 would require a longer section of the Last Chance Ditch (1 mile) to be rerouted as compared to the Peoples Ditch rerouted from the BNSF Alternative (approximately 1000 feet). As a result, fewer linear feet of historic ditches protected by Section 4(f) will be impacted by the BNSF-Hanford East Alternative.*
>
> *After considering the first four factors in Table 4-7, the BNSF-Hanford East is likely to result in fewer overall impacts to properties protected by Section 4(f) because it will not result in the demolition of the 9860 13th Avenue or require the acquisition of a portion of the parcel. While the BNSF-Hanford East will impact a historic ditch, the ditch is similar in significance to those impacted by the other alternatives and the required rerouting will be substantially shorter than the other alternatives.*
>
> ***Impacts on Environmental Resources Outside of Section 4(f) Uses***
>
> *FRA also considered the other factors beyond the potential impacts to properties protected by Section 4(f). As shown in Table 4-7, while all of the alternatives are consistent with the Project's purpose and need, each will result in different comparative impacts to the other resource areas. For example, the BNSF-Hanford East Alternative will result in fewer overall impacts to riparian areas and habitat for special-status species. Similarly, the BNSF-Hanford East Alternative will result in fewer impacts to waters of the U.S. (including wetlands), which is the primary*

consideration of the U.S. Army Corps of Engineers in its determination of the Least Environmental Damaging Practicable Alternative. In addition, the BNSF-Hanford East Alternative will result in fewer overall displacements of commercial and industrial businesses and is likely to result in fewer noise impacts as compared to the other alternatives. However, the BNSF-Hanford East will result in the greatest impacts to agricultural properties and confined animal facilities. In addition the BNSF-Hanford East will require the greatest number of relocations and will impact the community facility at Lakeside Cemetery. With respect to other factors like travel time, while the BNSF Alternative has the highest travel time of the alternatives under consideration it is only an increase of roughly ½ minute. Based on this information, while each of the alternatives will cause impacts to resources not protected by Section 4(f), those resulting from the BNSF-Hanford East Alternative do not outweigh the additional adverse impacts to properties protected by Section 4(f) that would otherwise result from the Hanford West alternatives.

4.10 Section 6(f)

Develop a separate section to consider any Section 6(f) properties identified during the evaluation. The following text can be used to introduce this section.

The purpose of LWCF is to assist in preserving, developing, and ensuring accessibility to outdoor recreation resources and to strengthen the health and vitality of the citizens of the U.S. by providing funds, planning, acquisition, and development of facilities. Recreational facilities awarded such funds are subject to the provisions of the act. The LWCF's most important tool for ensuring long-term stewardship is its "conversion protection" requirement. Section 6(f)(3) strongly discourages conversions of state and local park and recreation facilities to other uses.

Section 6(f)(3) of the LWCF Act requires that no property acquired or developed with LWCF assistance will be converted to other than public outdoor recreation uses without the approval of the Secretary of the DOI (NPS is a service of the DOI), and only if the secretary finds it to be in accord with the then Statewide Comprehensive Outdoor Recreation Plan (SCORP), and only upon such conditions as the secretary deems necessary to ensure the substitution of other recreation properties of at least equal fair market value and of reasonably equivalent usefulness and location (36 C.F.R. Part 59).

Prerequisites for conversion approval as provided in 36 C.F.R. Part 59.3 are as follows:

- All practical alternatives to the proposed conversion have been evaluated.
- The fair market value of the property to be converted has been established, and the property proposed for substitution is of at least equal fair market value as established by an approved appraisal.
- The property proposed for replacement is of reasonably equivalent usefulness and location as that being converted.
- The property proposed for substitution meets the eligibility requirements for LWCF-assisted acquisition.
- In the case of assisted sites that are partially rather than wholly converted, the impact of the converted portion on the remainder will be considered. If such a conversion is approved, the unconverted area must remain recreationally viable or must also be replaced.
- All necessary coordination with other federal agencies has been satisfactorily accomplished.
- The guidelines for environmental evaluation have been satisfactorily completed and considered by the NPS during its review of the proposed Section 6(f)(3) action. In cases where the proposed conversion arises from another federal action, final review of the

proposal will not occur until the NPS regional office is assured that all environmental review requirements related to the other action have been met.

- State intergovernmental clearinghouse review procedures have been adhered to if the proposed conversion and substitution constitute significant changes to the original LWCF project.
- The proposed conversion and substitution are in accord with the SCORP or equivalent recreation plans.

Section 6(f) conversion requires additional coordination with the agency of jurisdiction and California State Parks, which oversees the LWCF program for the NPS, and the NPS regarding the project effects and conversion area and replacement property.

Identify any 6(f) properties and describe the impacts and measures to minimize harm to these properties. The No Project Alternative should also be described. Also, if there are Section 6(f) properties in the vicinity of the project study area, verify that there are no ancillary structures or temporary construction impacts to the Section 6(f) property. If there is no impact, add a statement indicating that the nearby Section 6(f) properties have been evaluated and that there are no impacts.

4.10.1 Converted Area Description

Example text from the Fresno to Bakersfield Section Final EIR/EIS Section 4(f)/6(f) Evaluation is provided below.

> *No Project Alternative*
>
> *Although this alternative would have no impact on [identify property that would be converted], it would not address the state's need for an intercity transportation system, including the need in the [location of HSR section]. This alternative is insufficient to meet existing and future travel demand; current and projected future congestion of the transportation system will continue to result in deteriorating air quality, reduced reliability, and increased travel times. Because it does not meet the project purpose and need, the No Project Alternative is not feasible.*
>
> *BNSF Alternative*
>
> *As previously described and shown on Figure 4-7, construction and operation of the BNSF Alternative would require the conversion of approximately 1.7 acres of Colonel Allensworth State Historic Park. This area represents less than 1 percent of the 240-acre park. An area of 1.7 acres east of Road 84, which are currently vacant public lands, would be converted to alignment right-of-way uses.*
>
> *The remaining park area includes a visitor center, picnic area, tent and RV camping areas, several homes (including the Allensworth home), stores, a bakery, a blacksmith area, a drugstore, barber shop, post office, library, hotel, schoolhouse, a Baptist Church, restaurant, various farm buildings, and several other buildings that have been reconstructed to reflect the 1908 to 1918 historical period.*
>
> *In addition to direct impacts on the converted areas of the park, indirect impacts on the unconverted areas of the park could also result from the BNSF Alternative, where such areas would not remain recreationally viable. As described in Section 3.4, Noise and Vibration, the BNSF Alternative would be located as close as 150 feet from existing park facilities and would result in increases in noise and vibration in the park. With implementation of mitigation measures, potential operational noise and vibration impacts would be reduced to less-than-significant levels. Although construction vibration impacts on the park would remain significant*

and unavoidable, even with mitigation, these impacts would be short-term and would not affect the recreational viability of the park.

As described in Section 3.16, Aesthetics and Visual Resources, the visual setting of the park would be altered by the BNSF Alternative because construction and operation of the HSR would introduce an industrial transportation element to the park's agricultural valley landscape. The HSR would intrude on the existing park experience, undermine the integrity of the visual setting, and thereby reduce the recreational viability of the park until the HSR landscape screening has grown to maturity.

Both lands that are directly impacted and those that are indirectly impacted would be required to be replaced. If the BNSF Alternative is implemented, a replacement property would be provided that would meet the requirements for a reasonably equivalent usefulness and location. In addition, the replacement property would be of at least equivalent fair market value. The NPS prerequisites for conversion approval state that all necessary coordination with other federal agencies must be satisfactorily accomplished. In addition, in cases where the proposed conversion arises from another federal action, final review of the proposal will not occur until the NPS regional office is assured that all environmental review requirements related to that other action have been met. This process is under way in conjunction with FRA through the EIR/EIS process.

4.10.2 Section 6(f) Summary

Following the description of the Section 6(f) properties, include a summary that documents the conclusions of the Section 6(f) evaluation and, if a conversion would take place, the steps that are undertaken to ensure that an evaluation of the conversion has been completed and coordinated with NPS. Some example text from the *Fresno to Bakersfield Section Final EIR/EIS* Section 4(f)/6(f) Evaluation is provided below.

Colonel Allensworth State Historic Park is the only Section 6(f) property located within the study area, and a conversion of portions of the park would only occur under the BNSF Alternative. Due to the impacts related to Section 4(f) and Section 6(f), and the fact that a feasible and prudent avoidance alternative exists for Colonel Allensworth State Historic Park, implementation of the BNSF Alternative is not anticipated at this location. However, if the BNSF Alternative is selected, because of the timing of the project, environmental evaluation, and the need to demonstrate completion of environmental review requirements, the Authority and FRA would provide additional environmental evaluation for the Section 6(f) conversion consistent with NPS NEPA requirements, including a 30-day public comment period after publishing a Draft EIR/EIS assessing impacts of the conversion. The FRA could issue its NEPA determination and Record of Decision on this EIR/EIS before the NPS determination specific to Section 6(f) conversion. The NPS evaluation would be coordinated with the NPS and will meet the remaining prerequisites for conversion approval, including establishing the fair market value of the property to be converted and the property proposed for substitution, which would be of at least equal fair market value as established by an approved appraisal. In addition, subsequent environmental evaluation of the conversion will include analysis of the impacts of conversion for the replacement property, once the property has been identified.

4.11 Final 4(f)/6(f) Evaluation

As noted previously, after circulation of the draft Section 4(f)/6(f) Evaluation in accordance with 23 C.F.R. Part 774.5(a), FRA will consider comments received on the evaluation and finalize the comparison of all factors listed in 23 C.F.R. Part 774.3(c)(1) for all the alternatives. Document the analysis and identification of the alternative with the least overall harm in the final Section 4(f)/6(f) Evaluation. For the final Section 4(f)/6(f) Evaluation, include information from the draft evaluation and the following:

- A discussion of the basis for concluding that there are no feasible and prudent alternatives to the use of the Section 4(f) property. The supporting information must demonstrate that "there are unique problems or unusual factors involved in the use of alternatives that avoid these properties or that the cost, social, economic, and environmental impacts, or community disruption resulting from such alternatives reach extraordinary magnitudes" (23 C.F.R. Part 771.135(a)(2)). This language should appear in the document together with the supporting information.
- A discussion of the basis for concluding that the proposed action includes all possible planning to minimize harm to the Section 4(f) property. When there are no feasible and prudent alternatives that avoid the use of Section 4(f) property, the final Section 4(f) evaluation must demonstrate that the preferred alternative is a feasible and prudent alternative with the least harm on the Section 4(f) resources after considering mitigation to the Section 4(f) resources.
- A summary of the appropriate formal coordination with the headquarters offices of DOI (or appropriate agency under that department) and, as appropriate, the involved offices of U.S. Department of Agriculture and U.S. Department of Housing and Urban Development.
- Copies of all formal coordination comments and a summary of other relevant Section 4(f) comments received and analysis and response to any questions raised. Where new alternatives or modifications to existing alternatives are identified and will not be given further consideration, the basis for dismissing these alternatives should be provided and supported by factual information. Where Section 6(f) property is involved, the NPS's position on the land transfer should be documented.
- A concluding statement: "Based upon the above considerations, there is no feasible and prudent alternative to the use of land from the [identify Section 4(f) property] and the proposed action includes all possible planning to minimize harm to the [identify Section 4(f) property] resulting from such use."

4.12 Products

The HSR RC is responsible for preparing the following products, under Authority and FRA direction, according to PMT guidance and subject to PMT quality control and assurance:

4.12.1 Technical Report or Appendix

1. Draft Section 4(f)
2. Final 4(f)/6(f) Evaluation

4.12.2 Project EIR/EIS Volume I

1. Summary/Table for EIR/EIS Executive Summary
2. Section 4(f) and Section 6(f) Chapter

4.13 Section 4(f) and Section 6(f) EIR/EIS Outline

The RC shall use the following outline for organizing content related to Chapter 4 using the heading hierarchy and format as indicated.

Chapter 4 Section 4(f)/6(f) Evaluation
4.1 Introduction
  4.1.1 Laws, Regulations and Orders
    4.1.1.1 Federal
    4.1.1.2 Regional and Local (if applicable)
  4.1.2 Study Area
    4.1.2.1 Public Park and Recreation Lands, Open Space, and Wildlife and Waterfowl Refuges
    4.1.2.2 Historic Properties
  4.1.3 Section 4(f) Applicability
  4.1.4 Section 4(f) Use Definition
    4.1.4.1 Permanent Use
    4.1.4.2 Temporary Occupancy
    4.1.4.3 Constructive Use
    4.1.4.4 *De minimis* Impact
4.2 Coordination
4.3 Purpose and Need
4.4 Alternatives
  4.4.1 No Project Alternative
  4.4.2 Alternative 1
  4.4.3 Alternative 2
  4.4.4 Alternative 3
  4.4.5 Alternative N
4.5 Section 4(f) Applicability Analysis
  4.5.1 Parks, Recreation, Open Space, and Wildlife and Waterfowl Refuges
  4.5.2 Cultural Resources
4.6 Section 4(f) Use Assessment
  4.6.1 Parks, Recreation, Open Space, and Wildlife and Waterfowl Refuges
    4.6.1.1 (Specific location) Use Assessment
    4.6.1.2 (Specific location) Use Assessment
  4.6.2 Cultural Resources
    4.6.2.1 Section 4(f) Use Determinations at Historic Sites with Direct Adverse Effects under Section 106 of the NHPA
    4.6.2.2 Section 4(f) Use Determinations at Historic Sites with Indirect Adverse Effects under Section 106 of the NHPA
    4.6.2.3 Summary of Section 4(f) Use Determinations of Historic Properties
4.7 Avoidance Alternatives
  4.7.1 Individual Resource Avoidance Assessments
    4.7.1.1 Identify Specific Area
4.8 Measures to Minimize Harm
4.9 Section 4(f) Least Harm Analysis
  4.9.1 Least Harm Analysis for (insert specific area) Area Alternatives
  4.9.2 Least Harm Analysis for (insert specific area) Area Alternatives
  4.9.3 Net Harm to Section 4(f) Property
  4.9.4 Impacts to Environmental Resources Outside of Section 4(f) Uses
4.10 Section 6(f)
  4.10.1 Converted area: description
  4.10.2 Section 6(f) Summary

5 ENVIRONMENTAL JUSTICE

This chapter is designed to guide the high-speed rail (HSR) Regional Consultant (RC) through a thorough process of gathering relevant and sufficient data, including conducting focused outreach to environmental justice (EJ) populations, to evaluate potential project and cumulative impacts on EJ populations and identify the appropriate measures to mitigate the impacts. The following methodology describes the regulatory setting, affected environment, and methodology for evaluating the potential beneficial and adverse effects of the project on EJ populations from the alternative alignments, stations, and maintenance sites.

It is important to note that the EJ analysis incorporates information from the Socioeconomic and Communities analysis (Section 3.12) completed as part of the environmental impact report/ environmental impact statement (EIR/EIS) and the Community Impact Assessment (CIA) regarding demographics within the region and resource study area (RSA). In most cases, the region analyzed in the Socioeconomics and Communities section will be the same as the Reference Community identified in the EJ analysis. Other demographic data in addition to low-income and minority populations to show underserved populations in the region in relationship to the RSA are identified in Section 5.3.1 of this methodology. Coordinate both studies to ensure consistency of data.

This evaluation is based on the totality of impacts and includes the consideration of beneficial impacts and adverse impacts identified in the EIR/EIS resource discussions, including cumulative impacts and the perceptions of the affected EJ populations. Refer to the *Environmental Guidance to HSR Regional Teams EIR/EIS Revised CHSR Program Implementation and Ridership Assumptions, and Project Lexicon* (February 2013) for guidance on baseline years, HSR system configuration and phasing, and definitions of common terminology.

The resource evaluation in this chapter is organized to optimize the presentation of information in a way that is accessible to agency decision makers and the general public, as shown in the outline in Section 5.9. Information should be presented in plain language without excessive use of acronyms and technical jargon, and include illustrations to foster understanding. The method for preparing the EIR/EIS EJ chapter uses the same organizational scheme to format headings, text and tables, as the resource areas in Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Measures.

Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the chapter. Example text illustrating the various elements in EJ analysis is shown in *italics*. The methods are organized to mirror the organization of the EIR/EIS chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

5.1 Introduction

The Introduction provides the context for the EJ analysis. It identifies the laws, regulations, and orders pertinent to the identification and evaluation of EJ impacts, which require federal agencies to assess the potential for their actions to have disproportionately high and adverse environmental and health impacts on minority and low-income populations. Specific references will be made to related content in other sections of the EIR/EIS that influence or are influenced by the EJ analysis and supportive/associated technical documents. References to other documents must include citations. Identify federal agency guidance documents used in preparing the EJ analysis as well as U.S. Census and other relevant data sources. Following is an example of introductory text:

The EJ analysis in this Chapter complies with USEO 12898, Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations, which requires federal agencies to assess the potential for their actions to have disproportionately high and adverse environmental and health impacts on minority and low-income populations. This chapter also complies with the U.S. DOT's updated Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (U.S. DOT Order 5610(a)) and the Federal Railroad Administration (FRA) Procedures for Considering Environmental Impacts (64 Fed. Reg. 28556). The roots of EJ are in Title VI of the Civil Rights Act of 1964, which prohibits discrimination on the basis of race, color, and national origin, including the denial of meaningful access for limited English proficiency (LEP) persons, in programs and activities receiving federal financial assistance. Following the direction of USEO 12898, federal agencies developed guidelines to implement EJ.

Where appropriate, this analysis also incorporates guidance from the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA). These guidance documents include FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (FHWA Order 6640.23A) and Environmental Justice Policy Guidance For Federal Transit Administration Recipients (FTA Circular 4703.1).

This chapter describes the existing conditions related to EJ populations within the reference community and resource study area (RSA) which are defined below in Section 5.3.1. The potential for identified adverse impacts to affect minority and low-income populations will be assessed to determine whether the Project may have disproportionately high and adverse environmental and health impacts on minority and low-income populations. The EJ Engagement Report documenting the involvement process and concerns of the affected populations, as provided in Appendix 5-B, will be summarized in this chapter.

The data used in the analysis are derived from various sources, including the U.S. Census Bureau 2010 Decennial Census and U.S. American Community Survey (ACS) 2007-2011 dataset,[1] and the California Department of Finance (CDOF). In all cases the most current reliable data was used to document the EJ characteristics of the region and the resource study area.

Refer to related analytical and mitigation content in other sections of the EIR/EIS (e.g., Utilities, Socioeconomics, Agricultural Lands, Land Use, Cumulative) and supportive/associated technical documents. References to other documents must include citations to specific sections (by lowest heading tier, e.g., 3.X.X), not just a general reference to a chapter in the EIR/EIS.

5.2 Laws, Regulations, and Orders

Federal, state, and other laws, regulations, orders, or plans relevant to EJ are presented below. The EJ analysis is required by federal law but not required by the California Environmental Quality Act (CEQA).

5.2.1 Federal

5.2.1.1 Title VI of the Civil Rights Act (42 U.S.C. § 2000(d) et seq.)

Title VI of the Civil Rights Act prohibits discrimination on the basis of race, color, national origin, age, sex, or disability in programs and activities receiving federal financial assistance. Under Title VI, each federal agency is required to ensure that no person, on the grounds of race, color,

[1] Use an updated 5-year ACS dataset if available at the beginning of the analysis.

or national origin, is excluded from participation in, denied the benefits of, or subjected to discrimination under any program or activity receiving federal financial assistance.

5.2.1.2 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (USEO 12898)

USEO 12898 outlines the federal government's environmental justice policy. The USEO requires federal agencies to identify and address to the greatest extent practicable and permitted by law the disproportionately high adverse human health and environmental effects of their programs, policies, and activities, on minority and low-income populations in the United States.

5.2.1.3 Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (U.S. DOT Order 5610.2(a))

To implement USEO 12898, U.S. DOT relies on U.S. DOT Order 5610.2(a), which applies to actions undertaken by U.S. DOT operating administrations, including FRA. The U.S. DOT Order affirms the importance of considering environmental justice principles as part of early planning activities in order to avoid disproportionately high and adverse effects. The Order states that U.S. DOT will not carry out any programs, policies, or activities that will have a disproportionately high and adverse effect on minority populations or low-income populations unless "further mitigation measures or alternatives that would avoid or reduce the disproportionately high and adverse effect are not practicable." The Order defines environmental justice to mean an adverse impact that is predominately borne by a minority population or a low-income population, or that would be suffered by the minority population or low-income population, and that is appreciably more severe or greater in magnitude than would be suffered by the non-minority population or non-low-income population

5.2.1.4 Presidential Memorandum Accompanying USEO 12898

The Presidential Memorandum accompanying USEO 12898 calls for specific actions to be directed in National Environmental Protection Act (NEPA)-related activities. They include:

- Analyzing environmental effects, including human health, economic, and social effects on minority populations and low-income populations when such analysis is required by NEPA
- Ensuring that mitigation measures outlined or analyzed in environmental assessments (EA), EISs, and Records of Decision, whenever feasible, address disproportionately high and adverse environmental effects or proposed actions on minority populations and low-income populations
- Providing opportunities for community input in the NEPA process, including identifying potential effects and mitigation measures in consultation with affected communities and improving accessibility to public meetings, official documents, and notices to affected communities

5.2.1.5 Improving Access to Services for Persons with Limited English Proficiency (USEO 13166)

USEO 13166 requires each federal agency to ensure that recipients of federal financial assistance provide meaningful access to their programs and activities by LEP applicants and beneficiaries. Meaningful access can include availability of vital documents, printed and internet-based information in one or more languages, depending on the location of the project, and translation services during public meetings.

5.2.1.6 Uniform Relocation Assistance and Real Property Acquisition Policies Act (42 U.S.C. § 61)

The Uniform Relocation Assistance and Real Property Program ensures that persons displaced as a result of a federal action or by an undertaking involving federal funds are treated fairly, consistently, and equitably. This helps to ensure persons will not suffer disproportionate injuries as a result of projects designed for the benefit of the public as a whole.

5.2.2 State

5.2.2.1 California Government Code 65040.12(e)

Section 65040.12(e) defines EJ as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies." It does not, however, require an analysis of impacts to these populations as part of the CEQA process.

California High-Speed Rail Authority Environmental Justice Policy

In August 2012, the California High-Speed Rail Authority (Authority) adopted an Environmental Justice Policy (Authority 2012c). The policy states:

- The Authority shall develop and maintain an Environmental Justice Guidance in compliance with Title VI of the Civil Rights Act of 1964, Presidential Executive Order 12898, and California State law—Government Code Section 65040.2 et seq. and Public Resources Code (Public Res. Code) Section 1110 et seq.
- The Authority will promote environmental justice in its programs, policies, and activities to avoid, minimize, or mitigate disproportionately high human health and environmental effects, including social and economic effects on minority and low-income populations.
- The Authority will duly emphasize the fair and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the HSR project planning, development, operations, and maintenance.
- The Authority will engage the public through public participation forums so that decisions are mitigated and reflect EJ for all communities.

5.2.2.2 California High Speed Rail Title VI Plan

In March 2012, the Authority adopted a policy and plan to ensure that the California HSR Program complies with Title VI. The policy states:

- The Authority is committed to ensuring that no person in the State of California is excluded from participation in, nor denied the benefits of, its programs, activities, and services on the basis of race, color, national origin, age, sex, or disability as afforded by Title VI of the Civil Rights Act of 1964 and related statutes.
- The Authority, as a federal grant recipient, is required by the FRA to conform to Title VI of the Civil Rights Act of 1964 and related statutes. The Authority's sub-recipients and contractors are required to prevent discrimination and ensure non-discrimination in all of their programs, activities, and services.
- As permitted and authorized by Title VI, the Authority will administer a Title VI Program in accordance with the spirit and intent of the non-discrimination laws and regulations.

The Title VI Plan includes a commitment to inclusive public involvement of all persons affected by the HSR project (Authority 2012).

5.2.2.3 California High Speed Rail Limited English Proficiency Policy and Plan

In May 2012, the Authority adopted a policy and plan to ensure the California HSR Program complies with the requirements of USEO 13166. The policy states:

- It is the policy of the Authority to communicate effectively and provide meaningful access to LEP individuals to all the Authority's programs, services, and activities. The Authority will provide free language assistance services to LEP individuals encountered or whenever an LEP individual requests language assistance services.
- The Authority will treat LEP individuals with dignity and respect. Language assistance will be provided through a variety of methods, including staff interpreters, translation and interpreter service contracts, and formal arrangements with local organizations providing interpretation or translation services or telephonic interpreter services.

The LEP Policy and Plan supplements the Title VI Plan (Limited English Proficiency Plan) (Authority 2012b); Resolution 12-15 (Authority 2012b).

5.2.2.4 California Global Warming Solutions Act of 2006: Greenhouse Gas Reduction Fund (SB 535, De León)

This bill requires the California Environmental Protection Agency (Cal-EPA) to identify disadvantaged communities for investment opportunities, as specified. The bill requires the California Department of Finance (CDOF), when developing a specified 3-year investment plan, to allocate 25 percent of the available moneys in the Greenhouse Gas Reduction Fund to projects that provide benefits to disadvantaged communities, as specified, and to allocate a minimum of 10 percent of the available moneys in the Greenhouse Gas Reduction Fund to projects located within disadvantaged communities, as specified. The bill requires the CDOF, when developing funding guidelines, to include guidelines for how administering agencies should maximize benefits for disadvantaged communities. The bill requires administering agencies to report to the CDOF, and the CDOF to include in a specified report to the Legislature, a description of how administering agencies have fulfilled specified requirements relating to projects providing benefits to, or located in, disadvantaged communities.

5.2.3 Regional and Local

Review local and regional planning documents such as general and regional plans in topical areas including, but not limited to, housing, transportation, schools, public services, parks, and recreation to determine if they contain goals, policies or regulations addressing minority/low income, LEP, and elderly populations.

5.3 Methods for Evaluating Impacts

Explain the research and analysis methods used to identify and describe EJ populations and to determine whether the project would result in disproportionately high and adverse impacts to these populations. Include data collection methods and sources, inventory of regional and study area conditions, evaluation of analytical context, and qualitative or quantitative data analysis techniques. Also include a clear and thorough description of the methodology applied to evaluate the potential for disproportionately high and adverse impacts to EJ populations and describe the reference community and RSA within which the severity of impacts is ascertained.

Because CEQA does not identify significance thresholds for EJ or for disproportionately high and adverse effects on minority and low-income populations, federal guidance is used as the basis for determining whether the HSR would result in EJ impacts. Use the NEPA Impacts Summary table (provided for each resource evaluation in Chapter 3) as the source for this discussion. Use the same project segments described in Chapter 2 for mapping EJ populations, EJ resources such as

community centers, parks, churches, etc., and the location of impacts determined to adversely affect EJ populations.

5.3.1 Defining Reference Community and Resource Study Area

There are three factors that must be considered when conducting an EJ analysis: (1) the area comprising the general population that will be affected by the project (reference community), (2) the area that would be most directly affected by the project (RSA), and (3) the presence of EJ communities within the project area. Document the relationships among these three factors when considering the potential for disproportionate adverse impacts to EJ populations from the project.

5.3.1.1 Identifying the Reference Community

To establish a context for the EJ RSA and conduct the EJ analysis, it is necessary to identify what is called a "reference community." A reference community represents the general population that could be affected positively or negatively by the project. When establishing the boundaries for the reference community, choose boundaries that encompass the populations that will be affected by the project and describe the rationale for determining these boundaries. Examples of reference communities include counties, transit service districts, councils of government, and metropolitan planning organizations. Prepare a figure to show the visual relationship of the reference community to the RSA. This figure will include the entire HSR section and show the reference community and RSA boundaries.

Indicate the demographics for the reference community in a table for easy comparison to the RSA. The example *Table 5-1* assumes that several counties comprise the reference community; however, other reference communities can be used if they better demonstrate the general population that will be positively or negatively affected by the HSR project.

Table 5-1 Reference Community Demographic Characteristics (example only)

Characteristics	County[1]	County	County	County	Total
Size in square miles					
Total population					
Total households					
% population low-income					
Median household income					
% minority					
% limited English proficiency (14 and older)					
% over 65					
% unemployed					

[1]The information for the reference community should be available in the CIA or Socioeconomics and Community EIR/EIS section.

5.3.1.2 Identifying the Resource Study Area

The RSA comprises those areas where the project components, including tracks, stations, maintenance facilities, and consequential actions, could result in changes or impacts to EJ populations. The factors making up the RSA and the description of the elements comprising the RSA (including an illustrative figure) are provided in Section 3.0, General Methodology Guidance for Resource Sections.

For the EJ analysis, the RSA extends at least 0.5 mile beyond the project alignment footprint and at least 0.5 mile beyond the edges of a rectangular box around the perimeter of potential station and maintenance site footprints. Where the project may result in impacts to critical neighborhood amenities outside the RSA, expand the RSA to include those amenities. Also, expand the RSA when necessary to avoid splitting census tracks. In addition, the RSA may also be refined or expanded where necessary to encompass the range of an impact in relation to the EJ populations. It is essential that the views of the local jurisdiction are taken into account when refining or expanding the RSA to ensure local conditions are appropriately reflected. Any refinement or expansion should be completed in consultation with the FRA, Authority, and the Program Management Team (PMT).

Illustrate the boundaries of the RSA on a figure by segment, clearly indicating the expanded RSA around station and maintenance sites. In cases where the HSR alignments diverge, identify the RSA demographics for each alignment. Also show communities and any critical EJ amenities on the figures. Indicate demographics for the RSA in a table for easy comparison to the reference community demographics as per the example *Table 5-2*. Use 2010 census or more current data for this table.

Table 5-2 RSA Demographic Characteristics (example only)

Characteristics	Segment[1]	Segment	Segment	Segment	Total
Size in square miles					
Total population					
Total households					
% population low-income					
Median household income					
% minority					
% limited English proficiency (14 & older)					
% over 65					
% unemployed					

[1] The data for each segment should be available in the CIA or Socioeconomics and Community EIR/EIS sec*tion.*

Develop demographic data tables for each station area and maintenance site per example *Table 5-3*. The table may show additional population characteristics.

Table 5-3 Station Area Demographic Data (example only)

Station Location	Census Blocks Affected	Percent Minority	Median Household Income	Percent Population Below Poverty Threshold	Percent Population over 65	Percent Population with Limited English Proficiency
Station #1						
Station #2						

5.3.1.3 Sources of Demographic Data

Demographic data is available from a number of publicly available sources. The two primary sources for demographic data—the Decennial Census of Population and the 5-year ACS—are available from the U.S. Census Bureau.[2] This Census data will help to identify the locations and demographic characteristics of EJ and non-EJ populations. The Decennial Census data is available for small geographic areas, including census tracts, block groups, and blocks; whereas reliable data from the 5-year ACS is only available for census tracts.[3] Data from both the Decennial Census and the 5-year ACS are also published for larger geographic areas, such as census-designated places (unincorporated small towns), cities, and counties.

Census data on race, ethnicity, and age are available from both the Decennial Census as well as the 5-year ACS. The data from the Decennial Census is based on a 100-percent survey, but the data from the 5-year ACS are averages of five annual sample survey estimates. As such, the raw numbers may be used from the Decennial Survey, but use only percentages reflecting demographic characteristic from the 5-year ACS. ACS raw numbers may be used in calculations to estimate likely changes in total population or demographic characteristics, but should not be reported in the text or tables. Other types of socioeconomic data, such as poverty, income, limited English proficiency, and education, are available from the 5-year ACS. Similar data is developed through the statewide or metropolitan planning process for larger areas.

Update all Census data to the greatest extent possible. A key source to update Census information is the ACS. The most recent 5-year ACS is the 2007-2011 ACS. The 2008-2012 ACS data is scheduled for release in December 2013. Use which ever dataset is available at the start of work. If the 5-year ACS dataset has been updated since the Draft EIR/EIS was circulated for public and agency comment, confer with the Authority, FRA, and PMT to determine whether to update figures and tables with new ACS data or continue with older data. Explain the determination within the text of the Final EIR/EIS. Annual and 3-year ACS data are also available but are only released for geographies with population exceeding 65,000 and 20,000, respectively. And unlike the Decennial Census, the ACS survey data does not collect the exact same data each year. Describe unemployment characteristics; this data can be obtained from the California Employment Development Department. The CDOF provides population and housing estimates for cities, counties, and the state. The regional Associations of Government (SCAG, SANBAG, etc.) also can be a good source for data.

Because it has now been several years since the 2010 Decennial Census, the data used in the analysis should be validated with current information to ensure that no EJ group or cluster is overlooked. Validation sources could include scoping comments, information from outreach to low-income and minority populations, public service providers (including schools), community groups, churches, local chambers of commerce, planning departments, redevelopment agencies, and similar agencies and organizations. Table 5-4 identifies key information and sources for demographic data.

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[2] The types of data sets and resources available from the U.S. Census Bureau are summarized on their website at www.Census.gov. And data can be downloaded from American Factfinder website at http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t.

[3] Explanation of how these classifications are defined can be found in U.S. Census publications on social, economic, and housing characteristics, under "Area Classifications," and at www.Census.gov/geo/www/tiger/glossary.html.

Table 5-4 Key Information and Sources for Environmental Justice Information

Key Information	Sources of Information
Demographic characteristics in reference community and resource study area to include: ▪ Area of reference community and RSA ▪ Total population ▪ Percentage minority populations ▪ Distribution of minority populations (percent Hispanic, African American, Asian, etc.) ▪ Percentage of population living at or below the federal Health and Human Services poverty level ▪ Percentage of population over 65 years ▪ Existing number of households ▪ Median household income ▪ Percentage of households with limited English proficiency ▪ Percentage of households with incomes below the federal poverty level ▪ Maps, tables, and charts to help describe demographic characteristics	▪ Program EIR/EIS ▪ U.S. Census data ▪ U.S. American Community Survey ▪ California Employment Development Department ▪ California Department of Finance ▪ Regional Associations of Governments, and other sources available to provide most current regional and local data ▪ U.S. Department of Commerce ▪ Local redevelopment agencies and school districts ▪ General and regional land use plans, local planning department staff ▪ Community outreach, public and social service providers, local chambers of commerce

5.3.2 Defining and Mapping Environmental Justice Populations

Start with determining whether minority populations or low-income populations will experience potential environmental or health impacts from the project. Define and map these populations along the RSA using geographic information system (GIS) to show the locational patterns of these populations. It is recommended that the GIS mapping extend beyond the RSA to avoid splitting census tracts and to include critical EJ resources that may be outside the RSA.

5.3.2.1 Defining the Environmental Justice Populations

A **minority population** means any readily identifiable group or groups of minority persons who live in geographic proximity and, if circumstances warrant, geographically dispersed or transient persons (such as migrant workers, students, or Native Americans) who will be similarly affected by a proposed program, policy, or activity. Minority includes persons who are American Indian and Alaska Native, Asian, Black or African American, Hispanic or Latino, and Native Hawaiian and other Pacific Islander.

Low-income means a person whose median household income is at or below the Department of Health and Human Services poverty guidelines. A locally developed threshold or a percentage of median income for the area can also be used, provided that the threshold is at least as inclusive as the poverty guidelines. For example, in the San Francisco Bay Area, individuals with median household incomes below 200 percent of the federal poverty level are considered low-income. A **low-income population** means any readily identifiable group of low-income persons who live in geographic proximity and, if circumstances warrant, geographically transient persons (such as migrant workers, students, or Native Americans) who will be similarly affected by a proposed program, policy or activity.

The two terms "minority" and "low-income" should not be presumptively combined. There are minority populations of all income levels, whereas low-income populations may be one or more minority groups, or non-minority in a given area. As the definition of minority indicates, even minority populations can include several racial or ethnic groups.

Also define and discuss **elderly** and **LEP** populations in the EJ chapter drawing on information in the CIA and Socioeconomics and Communities EIR/EIS section. Elderly populations represent individuals who are over the age of 65 and LEP populations represent readily identifiable groups of persons over 14 years of age who do not speak English very well or at all.

5.3.2.2 Mapping the Environmental Justice Populations

Map the locations of minority and low-income populations in the RSA using GIS. Provide separate figures showing minority and low-income population dispersion as per example *Figure 5-1* and *Figure 5-2*. Map EJ populations by segment, using the same project segments described in Chapter 2, Alternatives. Where applicable, also map elderly and LEP populations. Provide a figure illustrating the locations of minority and low-income populations along the entire length of the alignment to show the relationship of the RSA to the reference community.

Economic Census data and Topologically Integrated Geographic Encoding and Referencing (TIGER) files included in the U.S. Census contain a digital database that can be used with GIS or other mapping software to show geographic distribution of populations and other Census data. The TIGER/Line files provide a digital database of geographic features, such as roads, railroads, rivers, lakes, political boundaries, and Census statistical boundaries.

Table 5-5 lists key information and sources for mapping EJ populations.

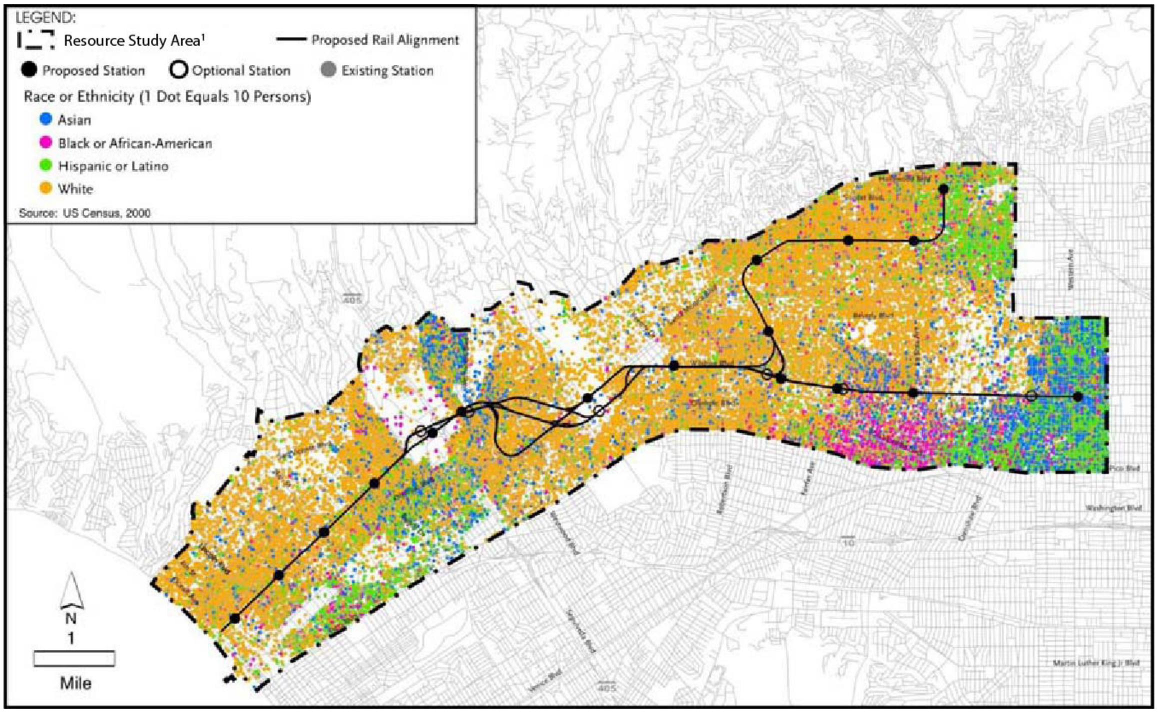
5.3.3 Environmental Justice Population Engagement and Documentation

The importance of engaging EJ populations throughout the NEPA process is identified in USEO 12898 and the accompanying Presidential Memorandum that directs "agencies to identify potential impacts and mitigations in consultation with affected EJ communities and ensure the accessibility of meetings, crucial documents, and notices." Consistent with U.S. DOT Order 5610.2(a) related to incorporating EJ into the transportation planning process, the analysis should be consistent with the following guiding principles:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations

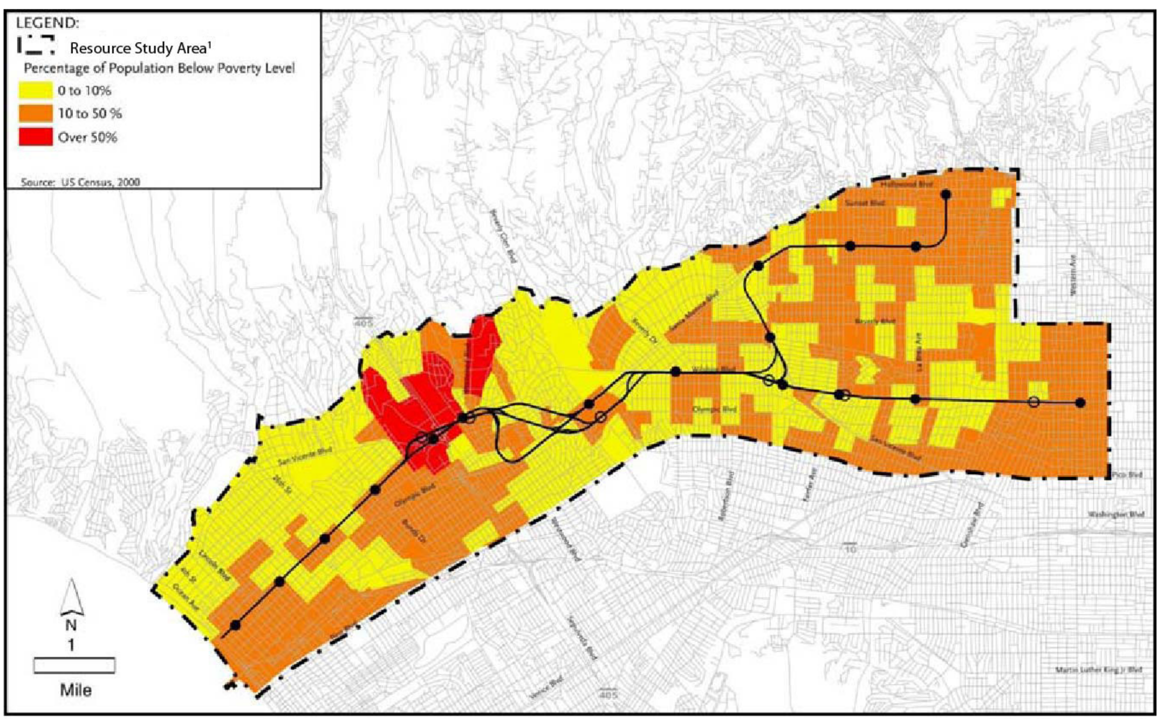
While these EJ goals should be considered throughout all public outreach and participation efforts conducted for the HSR project, the RC is required to develop a targeted EJ engagement plan to ensure the full and fair participation by EJ populations in the process. It will be important to identify any culturally distinct communities in the RSA (e.g., a Chinatown or Latino district) in order to ascertain if any culturally significant community amenities or facilities could be affected by the project. Incorporate outreach techniques in the EJ engagement plan that are designed to encourage meaningful participation from members of EJ and other federally protected populations in the affected area, including the elderly, children, disabled, and LEP populations. In developing the EJ engagement plan, the RC is encouraged to extend outreach more broadly to include other traditionally underserved populations. The RC is required to thoroughly document all identification, outreach, and communication efforts.

Additionally, the RC must periodically review the effectiveness of the public engagement process, and the procedures and strategies contained in the participation plan, to ensure a full and open participation process. Modify the EJ engagement plan as appropriate following a periodic review.



RSA boundaries may not correspond exactly with HSR segment boundaries

Figure 5-1 Minority Population Distribution (example only)



RSA boundaries may not correspond exactly with HSR segment boundaries

Figure 5-2 Low-Income Population Distribution (example only)

Table 5-5 Key Information and Sources of Information for Mapping Environmental Justice Populations

Key Information	Sources of Information
▪ Aerial maps ▪ GIS base ▪ Project description: HSR system, linear and sited facilities, stations, operations, ancillary improvements ▪ Station locations and footprints in sufficient detail to show on map ▪ Construction phases and interim build conditions/ transitions for all project and ancillary improvements and stations ▪ Right-of-way data showing parcel acquisitions ▪ Demographic characteristics in the RSA	▪ Project Engineering Team ▪ Local or regional governmental agencies ▪ Economic Census and TIGER files ▪ Field surveys, as appropriate ▪ Aerial and ground photography ▪ Community Impact Assessment

5.3.3.1 Engaging the Environmental Justice Populations

It is important to identify the presence of minority and low-income communities residing within and in close proximity to a proposed project early in the screening process through outreach to community-based organizations to identify distinct minority and low-income communities that could be adversely affected by the project. The RC should consult the identified EJ communities throughout the EIR/EIS process to ensure their meaningful input into project design, identification of disproportionately high and adverse impacts, and development of mitigation.

Use the information gained during the consultation process to inform the following:

- **Project Scoping**—Engage EJ populations as early as possible to identify those minority and low-income groups that use or are dependent upon natural resources that could be affected by the project. Non-traditional data gathering techniques, including outreach to community-based organizations early in the screening process, may be the best approach for identifying distinct minority and low-income community interests within the study area.
- **Considering Adverse Effects and Mitigations**—When considering whether a potential effect is "adverse," it is important to include the community that might be impacted by that effect in the discussion. What one population may perceive as an adverse effect, another may perceive as a benefit. It is also possible that, within the same population, the same action may be perceived by various segments as both an adverse effect and a benefit. When adverse effects are identified, evaluate whether there are any design modifications or variations to the project that would avoid the adverse effect.
- **Balancing Adverse and Beneficial Impacts**—The HSR project involves both adverse effects, such as short-term construction impacts, community disruption, etc., and beneficial effects, such as increased transportation options and overall improvement in air quality. Whether adverse effects will be disproportionately high is dependent on the net results after consideration of the totality of the circumstances. Consideration of these factors requires input from the members of EJ populations who may be impacted by the project to understand what they perceive as adverse and beneficial.
- **Identifying Disproportionately High Adverse Effects**—Whether an adverse effect is "disproportionately high" on minority and low-income populations depends on whether that effect is (1) predominantly borne by an EJ population or (2) will be suffered by the EJ population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-EJ population. Include the affected EJ populations in this

discussion to identify their priorities and needs. These communities also may provide insights into types of mitigations that may reduce the severity of the impact.

5.3.3.2 Methods for Engaging Environmental Justice Populations

Provide opportunities for EJ populations to analyze proposals, submit additional data, and provide comments through a variety of venues. More traditional methods include public and community meetings, signs, traditional and ethnic media, and radio and television announcements for LEP populations. Less traditional methods include interactive outreach sessions to receive comments and make them part of the public record; online technologies such as social networking, blogs, and video sharing; and visioning and scenario planning workshops. Communicate information in the dominant languages of the EJ populations. The RC must document all outreach efforts including participation by EJ populations where in-person meetings or outreach sessions are held.

In order to ensure meaningful participation by EJ populations, hold public meetings in locations that serve the interests of EJ communities, such as community centers, social service organizations, or local schools. Schedule times for the meetings to allow maximum participation by EJ communities. Design meetings to allow maximum input with the public participation process accessible to all. Core to the success of the meeting is to communicate clearly, which entails understanding the group’s preferred types of communications, and translation needs, prior to the meeting.

Provide notice to the community, including EJ populations, about the meeting in accordance with federal, state, and local requirements and in a manner designed to maximize public awareness. Provide documents that are made available for public review at locations that are easily accessible by EJ populations. At a minimum, provide these documents at local public library branches which may be open evenings and weekends and are in locations serving EJ populations.

Post or distribute signs and other materials at static locations for reaching targeted audiences who use the locations regularly. Other techniques include purchasing billboards in EJ communities, providing information kiosks at community events, and providing storefront displays. Additionally, the project website, local newspapers, and radio and television stations can be used to target EJ populations. Ethnic media that are delivered in native languages and provide information about public and cultural events occurring in the community may also provide opportunities for inclusion of news articles or editorial comments from their point of view.

Use digital media to communicate with people whose schedules do not allow them to attend meetings, to those who are intimidated or put off by large government-sponsored meetings or hearings, and to those who prefer to deliver their comments in writing rather than in person. Mobile phones and smartphones also have proven successful in reaching EJ populations. While not all members of EJ populations have convenient access to a computer, researchers have identified high rates of mobile phone and smartphone use among EJ populations. Thus, the use of “blast” public engagement information via text messages can be an effective way to reach a target audience.

5.3.3.3 Documenting the Environmental Justice Outreach

Summarize the activities undertaken as part of the EJ Engagement Plan in the EJ chapter to show how the specific EJ outreach was conducted and the issues that were identified during this outreach. Identify any measures incorporated into the project to address EJ issues. Summarize other outreach conducted as part of the NEPA process that identified EJ issues or concerns. Describe how substantial EJ concerns were addressed by the HSR project team. Some concerns may be incorporated into the project design, while others may become the foundation for enhancements.

Document detailed information about the EJ outreach in an appendix as part of the EJ Engagement Report. The outreach teams must keep a log of all EJ outreach events. The log should record the event, the attendance/participation, and the key comments and concerns received during the event, including recommended measures to minimize or avoid adverse impacts. Incorporate this log into the EJ Engagement Summary Report that demonstrates the meaningful involvement of EJ populations in the project development process. The EJ Engagement Report would be an appendix to the EIR/EIS.

5.3.4 Methodology for Impact Analysis

The following methodology describes the elements of the EJ impact analysis. As described below, two evaluations need to occur: (1) identifying any adverse human health and environmental effects on minority and low-income populations and (2) determining whether these adverse impacts would disproportionately affect the EJ populations.

5.3.4.1 Identifying Adverse Impacts

Identify and address all reasonably foreseeable adverse social, economic, and environmental effects on minority and low-income populations. Consider the totality of significant individual and cumulative human health or environmental effects, including interrelated social and economic effects as listed below, when identifying adverse impacts. As identified in U.S. DOT Order 5610.2(a), adverse effects include, but are not limited to:

- Bodily impairment, infirmity, illness, or death
- Air, noise, and water pollution and soil contamination
- Destruction or disruption of built or natural resources
- Destruction or disruption of community cohesion or a community's economic vitality
- Destruction or disruption of the availability of public and private facilities and services
- Vibration
- Adverse employment effects
- Displacement of persons, businesses, farms, or nonprofit organizations
- Increased traffic congestion, isolation, exclusion, or separation of minority or low-income individuals within a given community from a broader community
- The denial of, reduction in, or significant delay in the receipt of benefits of programs, policies, or activities

In general where impacts are identified in the EIR/EIS as either less than significant or non-existent, the resource does not need to be included in discussion of whether they constitute disproportionately high and adverse affects. In most cases, significant impacts in the EIR/EIS that would not impact EJ populations would not be considered adverse for the purposes of EJ analysis.

After considering input from the EJ populations, evaluate significant impacts in areas with EJ populations to determine whether they would be adverse. Significant impacts affecting EJ populations that cannot be mitigated to a less than significant level would be considered to adversely affect EJ populations. Evaluate significant impacts that are mitigated to less than significant levels to determine whether their mitigation measures (1) are equally applied to EJ and non-EJ populations and (2) if they address the concerns of the EJ populations. If the mitigation measures are not successful in addressing (1) and (2) above, the impact would be considered to adversely affect EJ populations. Remember that the efficacy of the mitigation measures should consider the views of the affected communities gained through EJ outreach.

5.3.4.2 Determining Disproportionately High and Adverse Effects

As noted in FTA Circular 4703.1, *disproportionately high and adverse effects, not population size, are the bases for EJ. A very small minority or low-income population in the project, study, or planning area does not eliminate the possibility of a disproportionately high and adverse effect on these populations. While the minority or low-income population in an area may be small, this does not eliminate the possibility of a disproportionately high and adverse effect of a proposed action. EJ determinations are made based on effects, not population size.*

Whether an adverse effect is "disproportionately high" on minority and low-income populations depends on whether that effect is (1) predominantly borne by an EJ population or (2) will be suffered by the EJ population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-EJ population. In making determinations regarding disproportionately high and adverse effects *mitigation and enhancements measures that will be implemented and all offsetting benefits to the affected minority and low-income populations should be taken into account, as well as the design, comparative impacts, and the relevant number of similar existing system elements in non-minority and non-low-income areas.*[4] Consult with EJ populations to inform determinations regarding disproportionately high and adverse effects. Whether adverse effects will be disproportionately high is dependent upon the net results after consideration of the totality of the circumstances, which include the following:

- The location of an adverse effect predominantly in EJ areas or in both EJ and non-EJ areas
- The percentage of the minority and low-income population in the area of impact as compared to the percentage of the minority and low-income population in the reference community
- The perceptions of the EJ populations affected by the impact regarding its severity and the success of the proposed mitigation measures in reducing impacts
- The equal application of mitigation measures to EJ and non-EJ populations
- The project benefits that will be received by the EJ populations
- Any social, religious, or cultural resources and public services such as police, fire and emergency services particularly important to the EJ populations that would be affected

5.4 Affected Environment

Present the characterization of affected environment for the reference community and for the RSA as described in Sections 5.3.1 and 5.3.2. Include the outreach to EJ populations as described in Section 5.3.3 as a separate subsection. Summarize the specific EJ outreach that was conducted and the issues that were identified during this outreach. Identify any measures incorporated into the project to address EJ issues. Reference the appropriate chapter in the EIR/EIS that more fully discusses public and agency involvement, if applicable. Describe how substantial EJ concerns were addressed by the HSR project team. Some concerns may be incorporated into the project design, while others may become the foundation for mitigation measures.

Other concerns may need a more detailed discussion to more clearly demonstrate the HSR project impact. For example, in the case of substantial EJ concerns regarding grade separation impacts, provide a table (*Table 5-6*) to show the percentage of grade separation in low-income and minority and low-income areas.

[4] U.S. DOT EJ Order 5610.2(a), Section 8.b.

Table 5-6 Grade Separation Characteristics (example only)

Alignment Segment	Percentage of Total Alignment Miles that is Grade Separated							
	In Minority Areas		In Non-Minority Areas		In Low-Income Areas		In Non-Low-Income Areas	
	% of Alignment	% Grade Separated	% of Alignment	% Grade Separated	% of Alignment	% Grade Separated	%of Alignment	% Grade Separated

Summarize regional and RSA demographics in tables as discussed in Section 5.3.1. Provide more specific EJ information for the RSA in the project segments defined by Chapter 2, Alternatives. Include a concise summary description of EJ populations and important community resources along the proposed HSR alignments and at proposed HSR facilities. In particular:

- Identify and map the location of low-income and minority populations and any important community resources. Also show station and maintenance sites and urban community footprints on the map.
- Document any culturally distinct communities.
- Describe pertinent stakeholder issues and concerns from the EJ and general public outreach efforts.

Table 5-7 identifies the key information and sources for developing the description of the affected environment.

5.5 Environmental Consequences

Provide detailed evaluation of the construction and operation impacts of the No Project and Project Alternatives, including long-corridor alternatives, short-corridor alternatives, station sites, and maintenance sites. Focus on the project impacts that could adversely affect EJ populations using the methodologies described in Section 5.3.4. A determination will be made whether the project *would* or *would not* result in a disproportionately high and adverse impact to minority or low-income populations. The consideration of adverse effects will include, but not be limited to, those identified by U.S. DOT Order 5610.2(a) as listed in Subsection 5.3.4.1.

Table 5-8 provides key information and sources for identifying impacts to EJ populations.

Table 5-7 Key Information and Sources of Information for Affected Environment

Key Information	Sources of Information
Demographic characteristics in reference community and resource study area to include: ▪ Size of reference community and RSA ▪ Existing population ▪ Percentage of population limited English proficiency ▪ Existing number of households ▪ Percentage population over 65 years ▪ Median household income ▪ Percentage of households with incomes below the defined poverty level ▪ Percentage of minority populations ▪ Distribution of minority populations (e.g., percent Hispanic, African American, Asian, etc.) ▪ Maps, tables and charts to help describe demographic characteristics ▪ Applicable policy and plans ▪ Aerial maps ▪ GIS base ▪ Project description: HSR system, linear and sited facilities, stations, operations, ancillary improvements ▪ Station locations and footprints in sufficient detail to show on map ▪ Construction phases and interim build conditions/transitions for all project and ancillary improvements, and stations ▪ Right-of-way data showing parcel acquisitions ▪ Community impact assessment technical report	▪ Program EIR/EIS ▪ U.S. Census data ▪ U.S. Department of Commerce ▪ General and regional plans ▪ American Community Survey ▪ California Employment Development Department ▪ California Department of Finance ▪ Regional Associations of Governments, and other sources available to provide most current regional and local data ▪ Field surveys, as appropriate ▪ Socioeconomic data ▪ Aerial and ground photography ▪ Topographic maps ▪ Economic Census and TIGER ▪ Aerial and ground photography ▪ GIS Data ▪ Information from public outreach efforts ▪ Scoping comments

Table 5-8 Key Information and Sources of Information for Identifying Impacts

Key Information	Sources of Information
▪ Mapping of minority and low-income populations in the RSA ▪ Scoping comments ▪ Project description—HSR system, linear and sited facilities, stations, operations, ancillary improvements ▪ Station locations and footprints in sufficient detail to show on map ▪ Construction phases and interim build conditions/transitions for all project and ancillary improvements, and stations ▪ Right-of-way data showing parcel acquisitions ▪ Community concerns and reactions to impacts and mitigations from EJ Outreach effort ▪ Project design features and other enhancements ▪ Locations of adverse impacts along the project section	▪ EIR/EIS Chapters 2 and 3 ▪ Field surveys, as appropriate ▪ Aerial and ground photography ▪ GIS Data ▪ Environmental Justice Outreach Report ▪ Community Impact Report

5.5.1 Assessing Resource Topic Impacts

Summarize the significant impacts associated with the resources evaluated in Chapter 3 and identified in the NEPA Impacts Summary Table, along with project contributions to cumulative impacts as presented in Section 3.19, Cumulative Impacts. Summarize the impacts associated with the No Project and Project Alternatives for alignment, station, and other facilities for each resource by location along the alignment, or within station areas and maintenance sites. Consider potential effects associated with critical neighborhood amenities as appropriate (for example, removal of the only supermarket, community clinic or hospital, job training center, major employer, or similar amenity that is critical or important to area) even if that amenity may be located outside the minority or low-income population area that was identified by using census tracts/census blocks.

Map an area of impact for each adverse impact at the location where the impact would occur, noting the type of impact (air quality, noise, displacement, etc). For some resources, e.g., air quality, the area of impact will extend outside the RSA. Also show the dispersal of the EJ population within the area of impact and compare to the characteristics of the reference community to determine if the percentage of EJ populations in the RSA is greater or less than the percentage of EJ populations in the reference community. When an impact occurs at several locations, determine the presence or absence of EJ populations at these locations so as to understand its relative impact to EJ and non-EJ populations.

Consider beneficial impacts, as well as perceptions from the affected EJ populations (gathered during EJ outreach), regarding the magnitude of an impact and possible mitigations to reduce the impact. Coordinate with the technical analysts to ensure internal consistency of mitigation measures between the Chapter 3 discussions and the EJ analysis. Consider the feasibility and effectiveness of proposed mitigations measures in reducing impacts to EJ communities, including, but not limited to, any special features of the relocation program that go beyond the Uniform Relocation Act, and address adverse community effects, such as separation or cohesion issues and the replacement of any community resources destroyed by the project. Should the totality of the impact remain adverse after consideration of the various factors, make a determination as to whether the adverse impact would disproportionately affect minority and low-income populations using the methodology identified in Section 5.3.4.

5.5.2 Summarize Disproportionate Effects on EJ Populations

To aid the reader in comparing the impacts by alternative that are determined to disproportionately impact minority and low-income populations, create a summary table that will identify these impacts by alternative and resource. An example (Table 5-9) is provided below.

Table 5-9 Alternative 1—Summary of Disproportionate Effects on Environmental Justice Populations (example only)

Effects	Segment #1	Segment #2	Segment #3	Station Site	Maintenance Site
Traffic congestion					
Displacements					
Community cohesion					
Aesthetics					
Health issues (air quality, noise, vibration, water quality, soil contamination)					
Cultural resources					
Employment					
Safety and security					
Parklands and community facilities					
Construction impacts					

5.6 Measures to Minimize Harm

In the context of EJ, it is anticipated that the EJ populations will be involved in developing enhancements for project impacts within their neighborhoods. The EJ engagement task identifies several key opportunities to discuss impacts and mitigations with EJ populations. The views of the EJ communities are one of the necessary factors in determining the success of mitigation measures to reduce impacts to a less than significant level.

If, after considering the adverse effects and potential benefits of the alternatives and the perception of the EJ populations, it is determined that there will be a disproportionately high and adverse effect on minority populations or low-income populations, evaluate whether there is a further practicable mitigation measure or design variation that would avoid or reduce the disproportionately high and adverse effects. *In determining whether a mitigation measure or alternative is "practicable," the social, economic (including costs) and environmental effects of avoiding or mitigating the adverse effects will be taken into account.*[5]

Should a specific measure be identified, describe the involvement of the affected populations in identifying this enhancement. Consider any enhancements or betterments that can be provided to the community. For example, a community may be more accepting of an unavoidable adverse effect of a new rail line if the project includes features such as better lighting, more trees, and community gathering areas.

[5] U.S. DOT Order, section 8.c.

5.7 Environmental Justice Determination

This section will summarize the overall conclusions of the EJ analysis including the effectiveness of the mitigations and other measures employed by the project to reduce adverse effects to EJ populations. Include an EJ determination, an example of which is provided below.

> ***Environmental Justice Determination***
>
> *The proposed [section name] Section would likely result in a limited set of adverse impacts on minority and low-income populations residing or conducting business in the project corridor. These impacts are expected to be the [same, greater, less] in kind and magnitude as those that would be experienced by the general population living or working along the corridor. Mitigation measures would be implemented to reduce effects to levels below those considered high and adverse.*
>
> *The minority and low-income populations in the study area would benefit from the transit improvements the [section name] Section would provide, including [list benefits]. Moreover, these benefits would be [equal to or greater, less than] the benefits to the general public.*
>
> *FRA and the Authority have been conducting targeted outreach activities for minority and low-income residents and businesses within the project corridor since [year]. FRA and the Authority also contacted [list specific contacts]. Appendix [X] documents how minority and low-income populations have been engaged in project planning activities. Significantly, members of minority and low-income populations [have/have not] voiced concerns substantially unlike comments from the general public.*
>
> *With the proposed design measures, best management practices, off-setting benefits, and mitigation commitments, FRA has preliminarily*[6] *concluded that the [HRS Alternative/Section name] would not result in disproportionately high and adverse environmental effects on minority and low-income populations.*

5.8 Products

The HSR RC is responsible for preparing the following products, under Authority and FRA direction, according to PMT guidance and subject to PMT quality control and assurance.

5.8.1 Technical Report or Appendix (as applicable to HSR project section)

1. Volume 2, Appendix 5-A, Environmental Justice Engagement Plan
2. Volume 2, Appendix 5-B, Environmental Justice Engagement Summary Report, including log of EJ meetings

5.8.2 Project EIR/EIS Volume 1

1. Summary for EIR/EIS Executive Summary
2. Environmental Justice Chapter for the EIR/EIS

The Environmental Justice Chapter for the EIR/EIS will contain a description of all mitigation and environmental enhancement actions incorporated into the project to address effects, including, but not limited to, any special features of the relocation program that go beyond the Uniform Relocation Act and address adverse community effects, such as separation or cohesion issues, and the replacement of the community resources destroyed by the project.

[6] The inclusion of the word "preliminarily" is expected in the publication of a Draft EIR/EIS, but would be not be included in the Final EIR/EIS.

5.9 Chapter 5—Environmental Justice EIR/EIS Outline

The RC shall use the following outline for organizing content related to Chapter 5 of the project EIR/EIS using the heading hierarchy and format as indicated.

Chapter 5 Environmental Justice
5.1 Introduction
5.2 Laws, Regulations, and Orders
  5.2.1 Federal
  5.2.2 State
  5.2.3 Regional and Local
5.3 Methodology
  5.3.1 Data Collection
  5.3.2 EJ Engagement
5.4 Affected Environment
  5.4.1 Reference Community and Resource Study Area Definition
    5.4.1.1 Reference Community
    5.4.1.2 Resource Study Area
  5.4.2 Reference Community Demographics
    5.4.2.1 Overview (Tables and Figures)
    5.4.2.2 Low-Income Populations
    5.4.2.3 Minority Populations
    5.4.2.4 Other Underserved Populations
  5.4.3 Resource Study Area Demographics
    5.4.3.1 Overview (Tables and Figures)
    5.4.3.2 Low-Income Populations
    5.4.3.3 Minority Populations
    5.4.3.4 Other Underserved Populations
  5.4.4 Station and Maintenance Area Demographics
    5.4.4.1 Overview (Tables and Figures)
    5.4.4.2 Low-Income Populations
    5.4.4.3 Minority Populations
    5.4.4.4 Other Underserved Populations
5.5 Environmental Justice Engagement
  5.5.1 Affected Populations and Communities
    5.5.1.1 Engagement Methods
    5.5.1.2 Outreach Events
  5.5.2 Issues and Concerns
    5.5.2.1 Areas of Concern
    5.5.2.3 Enhancement Measures
5.6 Assessment of Impacts
  5.6.1 Methodology
  5.6.2 No Project Alternative
    5.6.2.1 Segment 1
      Resource Discussion a, b, c
    5.6.2.2 Segment 2
      Resource Discussion a, b, c
    5.6.2.3 Segment 3
      Resource Discussion a, b, c
    5.6.2.4 Segment N
      Resource Discussion a, b, c

- 5.6.3 Alternative 1
  - 5.6.3.1 Segment 1
    - Resource Discussion a, b, c
  - 5.6.3.2 Segment 2
    - Resource Discussion a, b, c
  - 5.6.3.3 Segment 3
    - Resource Discussion a, b, c
  - 5.6.3.4 Segment N
    - Resource Discussion a, b, c
- 5.6.4 Alternative 2
  - 5.6.4.1 Segment 1
    - Resource Discussion a, b, c
  - 5.6.4.2 Segment 2
    - Resource Discussion a, b, c
  - 5.6.4.3 Segment 3
    - Resource Discussion a, b, c
  - 5.6.4.4 Segment N
    - Resource Discussion a, b, c
- 5.6.5 Alternative 3
  - 5.6.5.1 Segment 1
    - Resource Discussion a, b, c
  - 5.6.5.2 Segment 2
    - Resource Discussion a, b, c
  - 5.6.5.3 Segment 3
    - Resource Discussion a, b, c
  - 5.6.5.4 Segment N
    - Resource Discussion a, b, c
- 5.6.6 Alternative N
  - 5.6.6.1 Segment 1
    - Resource Discussion a, b, c
  - 5.6.6.2 Segment 2
    - Resource Discussion a, b, c
  - 5.6.6.3 Segment 3
    - Resource Discussion a, b, c
  - 5.6.6.4 Segment N
    - Resource Discussion a, b, c

5.7 Summary of Disproportionate Effects
- 5.7.1 Alternative 1
- 5.7.2 Alternative 2
- 5.7.3 Alternative 3
- 5.7.4 Alternative N

5.8 Measures to Minimize Harm
- 5.8.1 Avoidance
- 5.8.2 Enhancements

5.9 Environmental Justice Determination

6 PROJECT COSTS AND OPERATIONS

This chapter provides the basis for documenting the estimated costs for building, operating, and maintaining the project. The methodology is based on the Project Costs and Operations chapter in the *Merced to Fresno Section Final EIR/EIS* (May 2012) and *Fresno to Bakersfield Section Final EIR/ EIS* (April 2014) with examples drawn from the two documents.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the resource section. Example text that illustrates the concepts and methods is shown in *italics*. The methods are organized to mirror the organization of the environmental impact report/environmental impact statement (EIR/EIS) chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

Before preparation or revision of this chapter, the California High-Speed Rail Authority (Authority) and the Federal Railroad Administration (FRA) must formally review and accept the project footprint and associated construction and operational costs for the HSR Section. This occurs in two steps: (1) following the receipt of U.S. Environmental Protection Agency (USEPA) and U.S. Army Corps of Engineers (USACE) concurrence on Checkpoint B (Range of Alternatives) but prior to preparation of the Administrative Draft EIR/EIS and (2) during identification of the Preferred Alternative but prior to preparation of the Administrative Final EIR/EIS. These steps are described as part of the Authority's *Procedural Steps Required for Validating the Project Footprint for Environmental Evaluation.*

6.1 Introduction

This chapter discusses the estimated costs for building, operating, and maintaining the [section name] Section of the California High-Speed Rail (HSR) System, based on a preliminary level of design that would be used in preparing the project-level EIR/EIS. For the approach and details in preparing the construction cost estimates, refer to the project-level *[section name] Section Cost Estimate Report* (Authority and FRA [year]).

6.2 Capital Costs

Capital costs represent the total cost associated with the design, management, land acquisition, and construction of the HSR system. The estimate of long-term operations and maintenance (O&M) costs include both train operations and infrastructure maintenance. Operations consists of labor costs, electrical power, and other factors required to keep the HSR in service whereas maintenance includes routine servicing of vehicles, maintenance of the tracks, signals, communications, and other systems needed to keep the system safe and reliable.

To help evaluate and compare project construction costs, the FRA and the Authority have developed 10 main Standardized Capital Cost Categories. Each standard cost category is briefly described below:

- **10 Track Structures and Track**—includes elevated structures (bridges and viaducts), embankments and open cuts, retaining wall systems, tunnels, culverts and drainage, track (ballasted and non-ballasted), and special trackwork.
- **20 Stations, Terminals, Intermodal**—includes rough grading, excavation, station structures, enclosures, finishes, equipment; mechanical and electrical components, including HVAC, station power, lighting, public address/customer information systems; and safety systems, such as fire detection and prevention, security surveillance, access control, life safety systems, etc.

- **30 Support Facilities: Yards, Shops, Administration, Buildings**—includes rolling stock service, inspection, storage, heavy maintenance and overhaul facilities and equipment, as well as associated yard tracks and electrification. In addition, maintenance-of-way facilities are also included in this cost category.
- **40 Sitework, Right-of-Way, Land, Existing Improvements**—includes cost of demolition, hazardous materials removals, environmental mitigation, utility relocations, noise mitigation, intrusion protection, grade separations, roadway improvements, acquisition of real estate, and temporary facilities and other indirect costs.
- **50 Communications and Signaling**—includes all costs of implementing Automatic Train Control systems, inclusive of Positive Train Control and intrusion detection where it is applicable.
- **60 Electric Traction**—includes costs of traction power supply system, including supply, paralleling, and switching substations as well as connections to the power utilities; traction power distribution system in the form of Overhead Contact System.
- **70 Vehicles**—includes costs for acquisition of the trainsets (design, prototype unit, and production and delivery of trainsets to the project site on an annual basis). Acquisition of trainsets is considered a systemwide cost and is not included as part of the cost of individual HSR study alternatives.
- **80 Professional Services**—includes all professional, technical, and management services related to the design and construction of infrastructure (Categories 10 through 60) during the preliminary engineering, final design, and construction phases of the project/program (as applicable).
- **90 Unallocated Contingency**—includes program reserves.
- **100 Finance Charges**—includes finance charges expected to be paid by the project/program sponsor/grantee prior to either the completion of the project or the fulfillment of the FRA funding commitment, whichever occurs later in time (not included in the estimate).

6.2.1 High-Speed Rail Alternatives

The following text from the *Fresno to Bakersfield Section Final EIR/EIS (*April 2014) can be used for describing the conceptual cost estimates for the HSR study alternatives. Again, information for this section should be available from the *[section name] Section Cost Estimate Report* (Authority and FRA [year]) prepared by the Regional Consultant (RC) and Program Management Team (PMT).

The conceptual cost estimates prepared for each of the study alternatives were developed by utilizing recent bid data from large transportation projects in the western U.S. and by developing specific, bottom-up unit pricing to reflect common high-speed rail elements and construction methods with an adjustment for [project area] labor and material costs. All material quantities are estimated based on a preliminary level of design for the [section name] Section. This level of design has generally defined at-grade or elevated profiles, structure types, placement of retaining walls, and earth fill. Stations are still conceptual, but roadway and utility relocations have been identified, and power substations have been sized and located.

The costs include the total effort and materials to construct the [section name] Section, including modifications to roadways required to accommodate grade-separated guideways. It should be noted that the capital cost estimate reflects only related infrastructure improvements and does not include costs associated with the No Project Alternative.

Right-of-way costs were estimated based on the preliminary design and are provided in the *[section name] Section Preliminary Right-of-Way Requirements* Report (Authority [year]). However, as the design of the project evolves, the right-of-way limits will be reassessed to reflect refined property acquisition needs. As a result, property acquisition costs are estimated in broad categories (i.e., urban, suburban, and rural and by density level), based on local land values rather than relying on a parcel-by-parcel assessment at this phase of project development. Right-of-way costs include the estimated cost to acquire properties needed for the future right-of-way but do not include costs associated with temporary easements for construction that are assumed to be part of allocated contingencies added to right-of-way acquisition costs.

These costs do not include acquiring vehicles because they are part of the statewide system and are not associated with constructing individual sections. Consistent with the [year] Business Plan (Authority [year]), the cost of vehicles was determined by using publically available data regarding recent sales of comparable equipment to other projects around the world and by informally consulting with manufacturers. Additional costs are included for adaptation of existing trainset designs to meet U.S. safety regulations and to comply with "Buy America" requirements. The systemwide cost of vehicle procurement is divided into three parts: Initial Operating Section (Merced to the San Fernando Valley), Bay to Basin (from San Jose and Merced to the San Fernando Valley), and the Phase 1 Blended System (San Francisco to Los Angeles and Anaheim). Total vehicle procurement cost is estimated at $3.2 billion in 2011 dollars.

Modify this example text to reflect assumptions from the Authority's current Business Plan.

> *Professional services are estimated at [##] percent of the construction costs; these costs are divided between final design ([##]] percent), construction management ([##] percent), program management ([##] percent), and agency costs ([##] percent). Environmental mitigation costs are estimated at approximately [##] percent of the capital cost, given potential project impacts and typical mitigation costs in the region.*
>
> *At this stage of design, the design features will continue to be refined; therefore, early cost estimates include contingencies to account for changes in material costs and changes during project design. Currently, allocated contingencies (money reserves assigned to each cost category to cover risks associated with design uncertainty) are assumed to be between [##] percent and [##] percent of the estimated construction and right-of-way acquisition costs, and unallocated contingency (project reserves intended to cover unknown risks) is estimated at [##] percent of the construction and right-of-way acquisition costs.*
>
> *Table 6-1 shows estimates for each alternative from the [section name] Section Station to the [section name] Section Station.*

Table 6-1 is from Chapter 9 of the *Merced to Fresno Section Final EIR/EIS* and is presented as an example to follow.

Table 6-1 Capital Cost of the HSR Alternatives (2010 $Thousands) (example only)

FRA Standard Cost Categories	UPRR/ SR 99 Alternative with Ave 24 Wye	UPRR/ SR 99 Alterna-tive with Ave 21 Wye	UPRR/SR 99 Alternative West Chowchilla Design Option with Ave 24 Wye	BNSF Alterna-tive with Ave 24 Wye	BNSF Alterna-tive with Ave 21 Wye	Hybrid Alterna-tive with Ave 24 Wye	Hybrid Alterna-tive with Ave 21 Wye
10 Track structures & track	$	$	$	$	$	$	$
20 Stations, terminals, intermodal	$	$	$	$	$	$	$
30 Support facilities: yards, shops, admin. bldgs	$	$	$	$	$	$	$
40 Sitework, right of way, land, existing improve-ments	$	$	$	$	$	$	$
50 Com-munica-tions & signaling	$	$	$	$	$	$	$
60 Electric traction	$0	$0	$0	$0	$0	$0	$0
70 Vehicles	Considered a systemwide cost and not included as part of individual HSR study alternatives						
80 Profes-sional services (applies to Cats. 10-60)	$0	$0	$0	$0	$0	$0	$0
90 Unallo-cated con-tingency	$0	$0	$0	$0	$0	$0	$0
100 Finance charges	Estimate to be developed prior to project construction						
Total	$0	$0	$0	$0	$0	$0	$0

6.2.2 Heavy Maintenance Facility (only for Merced to Fresno and Fresno to Bakersfield HSR Sections)

Specific to the Merced to Fresno and Fresno to Bakersfield HSR sections, another project component of the HSR System is the construction and operation of a heavy maintenance facility (HMF). Four sites between Merced and Fresno and five sites between Fresno and Bakersfield are under consideration for the HMF. Table 6-2 lists the project costs for these design options, including connecting tracks and infrastructure. The costs for the HMF alternatives are estimated based on conceptual site and functional layouts and the unit costs for comparable rail equipment, maintenance, and storage facilities.

Table 6-2 is from Chapter 9 of the *Fresno to Bakersfield Section Final EIR/EIS* and is presented as an example to follow.

Table 6-2 Cost for Heavy Maintenance Facility Site Alternatives (example only)

FRA Standard Cost Categories	Heavy Maintenance Facility Base Year FY 2010 Dollars (thousands)
10 Track structures & track	$00
20 stations, terminals, intermodal	
30 Support facilities: yards, shops, admin. Bldgs.	
40 Sitework, right-of-way, land, existing improvements	
50 Communications & signaling	
60 Electric traction	
70 Vehicles	
80 Professional services (applies to Cats. 10–60)	
90 Unallocated contingency	
100 Finance charges	
Total	$00

FY = fiscal year

All of the HMF sites would be adjacent to one or more of the HSR alternative alignments, and their costs would include relatively similar components. For instance, each potential HMF site would require approximately the same length of lead guideway. The site plan is standard; therefore, there is no major difference at this level of design. The sites were screened to eliminate major resource conflicts and difficult site constraints. The proposed HMF sites would require relatively low land costs; therefore, there are no noticeable cost differences between the sites.

6.2.3 Terminal Storage Maintenance Facilities

Terminal station locations can be supported by a terminal storage and maintenance facility (TSMF) for the purpose of supplying inspected and serviced trainsets at the start of the revenue day. Planning for these facilities is based on the current implementation phases of the project. The needs for developing TSMF sites depends upon the service plans and phasing adopted by the Authority Business Plan. As an example, an incremental phasing step may be to operate a temporary terminus at Palmdale as a midpoint to the ultimate Initial Operating Section. Should this be the case, it may not be necessary to have a TSMF at Palmdale because the equipment could be maintained from the HMF, provided there were adequate storage tracks at the Palmdale

terminus. Terminal station locations will evolve as the system matures through the operating service segments as follows:

- Initial Operating Section—San Fernando
- Bay to Basin—San Jose (Gilroy) and San Fernando
- Phase 1 Blended Service—San Francisco, San Jose (Gilroy), Palmdale, and Los Angeles (San Fernando)

Depending on location, the TSMF will be sized to support specific maintenance activities. These activities include cleaning and servicing activities between runs, pre-departure inspections and testing, monthly inspection and maintenance activities, and in some instances train wash and wheel defect detection facilities.

6.3 Operations and Maintenance Costs

In conjunction with the PMT, prepare and include in the EIR/EIS Technical Appendices (Volume 2) an HSR Operations and Service Plan Summary and a memo documenting HSR O&M Costs for Use in EIR/EIS Project-Level Analyses. Use information from these two documents—along with pertinent information from the Authority's most recently adopted *Business Plan* and the *Environmental Guidance to HSR Regional Teams EIS/EIR Revised CHSR Program Implementation and Ridership Assumptions, and Project Lexicon* (June 2014)—to prepare this section of the chapter.

Modify the following example text to illustrate the type of information to be presented.

> *Chapter 2, Alternatives, describes O&M activities in greater detail. HSR service during Phase 1 would connect San Francisco with Los Angeles via the Central Valley by 2029. The plan is to offer express, limited-stop, and all-stop services, depending on time of day and projected needs. For Phase 1 there would be [##] HSR stations; up to [##] HSR stations would be located within the HSR [section name] Section. Multiple facilities would be required for overnight storage, inspection, and routine maintenance of over [##] trainsets, each 656 feet long, by 2035. An HMF serving the entire HSR system would be needed and would be located in the Merced to Fresno or Fresno to Bakersfield HSR section. The HMF would serve as a facility to store and maintain a portion of the trainsets. One maintenance-of-way facility would also be required approximately every 100 miles.*
>
> *O&M costs account for staff and supplies required to run the HSR system and keep it properly maintained. O&M costs are estimated based on daily rail miles, operation speeds, travel times, HSR station configurations, maintenance and storage facilities, and assumed operating frequencies (Parsons Brinckerhoff [year]). The apportionment of systemwide O&M cost estimates to the HSR [section name] Section is proportional to the O&M activity and facilities within the section.*

6.3.1 Operating Speeds

Describe the varying operating speeds the proposed HSR section alternatives would travel along the section corridor.

6.3.2 Travel Times

Modify the following sample text to illustrate the type of information to be presented.

> *Table 6-3 shows the optimal express train times between* [section name] *Section and other destinations in the proposed statewide HSR System.* [section name] *Section would connect to the Bay Area and Los Angeles in Phase 1.*

Table 6-3 Optimal Express Travel Times from HSR and Other Cities (hours:minutes) (example only)

	San Francisco	San Jose	Los Angeles	Anaheim	Sacramento (Phase 2)	San Diego (Phase 2)	Bakersfield
Fresno	1:20	0:51	1:24	1:43	0:59	2:42	0:37
Bakersfield	1:51	1:21	0:54	1:13	1:29	2:12	n—

6.3.3 Development of Operation and Maintenance Costs

Using information from the memo documenting HSR O&M Cost for Use in EIR/EIS Project-Level Analyses, prepare this section of the chapter.

Modify the following example text to illustrate the type of information to be presented.

> *O&M costs were estimated for the operations needed to serve and carry the forecast traffic for Phase 1, as described in Chapter 2, Alternatives; the maintenance necessary to keep the entire system in a state of good repair; and the administrative activities and costs. Unit prices were developed and applied to calculate the cost for each activity included in the operating plan. Although many of the O&M unit costs for the California HSR System would be similar to the costs of U.S. conventional rail operations and can be reliably estimated from U.S. practices and costs, the unit cost to maintain high-speed trainsets and dedicated high-speed rail infrastructure has no close analogy in the U.S. Therefore, international O&M unit cost projections from comparable HSR operations were applied to planned California operations, HSR technology, and local cost levels and labor practices.*
>
> *The O&M cost of HSR equipment includes the cost of (1) crew, administration, and supplies to operate and dispatch the HSR services; (2) electric power for traction, onboard systems, stations, and maintenance/other facilities; and (3) cleaning, inspection, maintenance, and overhaul of trainsets.*
>
> *Maintenance of infrastructure covers the costs of patrolling, inspecting, and maintaining the right-of-way, fencing, structures, bridges, tunnels, roadbed, track, signaling, overhead electric traction power system, substations and similar electrical facilities, communications, intrusion detection, and facilities.*
>
> *Station costs include the day-to-day operations of the station, ticket sales and machine maintenance, public safety, passenger handling, and cleaning.*
>
> *Insurance, administration, and contingency costs round out the categories of costs presented.*

At the higher level of activity associated with fare revenue based on ridership forecasts at the "high" or 75th percentile, maintenance of equipment activities around the state would employ [##] persons, transportation operations would employ [##] persons, maintenance of infrastructure activities would employ [##] persons, and all other activities would employ [##] persons. At the lower level of riders and operations associated with fare revenue based on ridership at the "medium" or 50th percentile, employment would be roughly [##] percent in the three categories, except maintenance of infrastructure, which would be similar to the estimated employment with ridership at the high or 75th percentile.

Table 6-4 lists the total O&M costs estimated for the full system, on completion of Phase 1, of the California HSR System for the year 2040.

Table 6-4 Annual Phase Full System O&M Cost, Year 2040 (20XX $Millions) (example only)

O&M Activity	HSR Fares Based on the Medium Forecast (50th Percentile)	HSR Fares Based on the High Forecast (75th Percentile)
O&M of equipment	$00	$00
Maintenance of infrastructure	$00	$00
Stations	$00	$00
Insurance	$00	$00
Administration (10% of above)	$00	$00
Contingency (10% of above)	$00	$00
Total	$00	$00

HSR = high-speed rail
O&M = operating and maintenance

O&M costs in 20[xx] dollars as apportioned to the [section name] Section are shown in Table 6-5, based on the levels of activity associated with the section as a proportion of full system costs. The costs associated with O&M of equipment are apportioned on the basis of trainset miles operated within the [section name] Section with and without the HMF. The costs associated with maintenance of infrastructure are apportioned as a ratio of [##] route miles to the [##] Phase 1 total route miles. The costs associated with Stations are apportioned as a ratio based on [##] of the [##] Phase 1 stations being situated in the [section name] Section. The costs of Administration and Contingency are calculated as a percentage of the overall system costs.

Table 6-5 Annual 2040 O&M Costs Apportioned to the HSR Section (20XX $millions) (example only)

Annual O&M Cost	HSR Fares Based on the Medium Forecast (50th Percentile)		HSR Fares Based on the High Forecast (75th Percentile)	
	Without HMF	With HMF	Without HMF	With HMF
O&M of equipment	$00	$00	$00	$00
Maintenance of infrastructure	$00	$00	$00	$00
Stations	$00	$00	$00	$00
Insurance	$00	$00	$00	$00
Administration (10% of above)	$00	$00	$00	$00
Contingency (10% of above)	$00	$00	$00	$00
Total	$00	$00	$00	$00

HMF = heavy maintenance facility
HSR = high-speed rail
O&M = operations and maintenance

6.4 Products

The RC is responsible for preparing the following products, under Authority and FRA direction, according to PMT guidance and subject to PMT quality control and assurance.

6.4.1 Project EIR/EIS Volume 1

1. Summary for EIR/EIS Executive Summary
2. Project Costs and Operations Chapter for the EIR/EIS

6.4.2 Project EIR/EIS Volume 2

1. Operations and Service Plan Summary
2. Operating Cost Memorandum

6.5 Chapter 6—Project Costs and Operations EIR/EIS Outline

The RC shall use the following outline for organizing Chapter 6 of the project EIR/EIS, using the heading hierarchy and format as indicated.

Chapter 6 Project Costs and Operations
6.1 Introduction
6.2 Capital Costs
  6.2.1 High-Speed Rail Alternatives
  6.2.2 Heavy Maintenance Facility (only for Merced to Fresno and Fresno to Bakersfield HSR Sections)
6.3 Operation and Maintenance Costs
  6.3.1 Operating Speeds
  6.3.2 Travel Times
  6.3.3 Development of Operation and Maintenance

7 OTHER CEQA/NEPA CONSIDERATIONS

This chapter is designed to guide the high-speed rail (HSR) Regional Consultant (RC) through the process of describing any unavoidable adverse, potentially significant impacts resulting from implementation of the proposed HSR project. The chapter also describes the relationship between short-term uses of the environment and long-term productivity. Additionally, any significant irreversible environmental changes or irretrievable commitments of resources from implementing the proposed HSR will be identified. This chapter is based on the detailed analysis of environmental resources of concern presented in Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Measures. A discussion of the environmentally superior alternative, environmentally preferable alternative, and the least environmentally damaging practicable alternative is provided in Chapter 8, Preferred Alternative.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the chapter. Example text that illustrates the concepts and methods is shown in *italics*. The methods are organized to mirror the organization of the environmental impact report/environmental impact statement (EIR/EIS) chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

7.1 Significant and Unavoidable Adverse Impacts

The following text from the *Fresno to Bakersfield Final EIR/EIS* (April 2014) can be adapted to introduce the discussion in this section.

> *Chapter 2, Alternatives, explains the efforts the agencies have made through the tiered project development and environmental review process to design the HSR System and the [section name] Section in a manner that avoids and minimizes impacts. Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Measures, describes the potential environmental consequences of developing and operating the [section name] Section of the HSR System. Measures were prescribed to mitigate significant adverse impacts. In some cases the mitigation would not reduce the impact's severity to a less-than-significant level. The impacts that cannot be mitigated to a less- than-significant level are the following:*

Briefly describe, by topic area, the impacts for specific topic areas that cannot be reduced to a less-than-significant level with mitigation.

When no mitigation measure has been identified for an unavoidable and significant adverse impact, briefly discuss the reason(s) for determining mitigation is not feasible.

Where there are impacts that cannot be alleviated without imposing an alternative design, describe the rationale for, and implications of, undertaking the project notwithstanding the unavoidable impacts.

7.2 Relationship between Short-term Use of the Environment and the Enhancement of Long-term Productivity

Developing the [section name] Section of the HSR project would require an investment of materials to create new transportation infrastructure. This investment of materials is expected to include natural resources, such as rock and aggregate (e.g., for alignment and other facility foundations), steel (e.g., for rail and catenary structures), other building materials, and the various structural components of the HSR trains. Fossil fuels would be consumed for project construction. In addition, the project would require conversion of land to accommodate the new

transportation infrastructure. In many cases, the land required is already being put to economic use as productive farmland, urban and rural structures (including homes, businesses, and parks), and local roads and state highways. The consequences of these land conversions are described in Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Measures.

Describe land that would be required to create a new transportation infrastructure.

The consequences of these land conversions are described in Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Measures.

Discuss the long-term benefits associated with implementing the HSR system, project response to need and achievement of purpose stated in Chapter 1. For example the *Fresno to Bakersfield Final EIR/EIS* states:

> *As indicated in Chapter 1.0, Project Purpose, Need, and Objectives, the capacity of California's intercity transportation system, including in the San Joaquin Valley, is insufficient to meet existing and future travel demand, and the current and projected future congestion of the system will continue to result in deteriorating air quality, reduced reliability, and increased travel times. The Fresno to Bakersfield Section of the HSR project would provide benefits (such as increased safety, reduced pollutant emissions, and reduced greenhouse gases) and accessibility improvements (such as transit linkages to the Bay Area, Sacramento, and Southern California). HSR service will provide linkages to a number of bus, light rail, and commuter rail services for intercity travelers to other areas. Because the HSR System would provide a new alternative to regional transportation options that consume fossil fuels (e.g., automotive trips and commercial air travel), and because the HSR System would be powered by electricity primarily generated by harnessing renewable resources (e.g., solar power, wind power), the [section name] Section of the HSR project would make an important contribution to greenhouse gas reduction efforts. As described in Section 3.18, Regional Growth, the proposed HSR System would provide direct and indirect economic benefits, including short- and long-term employment benefits. [insert description of station site development benefits and source of regional job growth (internal vs. population shifts]. The benefits of the HSR Project are described in more detail in Chapter 1, Project Purpose, Need, and Objectives.*

7.3 Significant Irreversible Environmental Changes that Would Result from the Proposed Project if Implemented

The [section name] Section of the HSR System would require the commitment of material and energy for construction and operation and the commitment of land for HSR facilities. As previously described, the project would require an investment of materials such as rock, aggregate, steel, and other building materials. Fossil fuels would be consumed for project construction. In addition, the project would require the conversion of land, including productive agricultural land, to accommodate the new transportation infrastructure (including stations and ancillary facilities). These environmental changes would be irreversible. The significance of these impacts is evaluated throughout Chapter 3, Affected Environment, Environmental Consequences, and Mitigation Measures. Overall, it is expected that residents and businesses in the region would benefit from the improved quality of the transportation system (e.g., improved accessibility, increased capacity, energy savings), which would outweigh the irreversible commitment of resources.

Identify any additional changes that would result in significant irreversible environmental changes or irreversible and irretrievable commitments of resources that would result from implementation of the project.

7.4 Products

The HSR RC is responsible for preparing the following products, under California High-Speed Rail Authority and Federal Railroad Administration direction, according to Program Management Team (PMT) guidance and subject to PMTquality control and assurance.

7.4.1 Project EIR/EIS Volume 1

1. Summary for EIR/EIS Executive Summary
2. Other CEQA/NEPA Considerations Chapter 7 for the EIR/EIS

The Other CEQA/NEPA Considerations chapter for the EIR/EIS will describe any unavoidable adverse, potentially significant impacts, including significant irreversible environmental changes resulting from the HSR project.

7.5 Chapter 7— Other CEQA/NEPA Considerations EIR/EIS Outline

The HSR RC shall use the following outline for organizing Chapter 7 of the project EIR/EIS, using the heading hierarchy and format as indicated.

Chapter 7 Other CEQA/NEPA Considerations
7.1 Significant and Unavoidable Adverse Impacts
7.2 Relationship between Short-term Use of the Environment and the Enhancement of Long-term Productivity
7.3 Significant Irreversible Environmental Changes that Would Result from the Proposed Project if Implemented

8 PREFERRED ALTERNATIVE AND STATION SITE(S)

This chapter is designed to guide the HSR Regional Consultant (RC) on presenting the California High-Speed Rail Authority's (Authority) and the Federal Railroad Administration's (FRA) preferred High-Speed Rail (HSR) section alternative. The chapter describes the preferred alternative rail alignment and station site(s) for the HSR section and provides evaluation of the preferred alternative identification process. Provide a brief description of the purpose and content of this chapter in the HSR section Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS). Prepare this chapter upon completion of the public comment period for the EIR/EIS, concurrently with preparation of the NEPA/Section 404/408 Integration Checkpoint C concurrence package. Complete the chapter for the Final EIR/EIS after the Authority Board of Directors has formally identified the preferred alternative, and after Checkpoint C concurrence on the least environmentally damaging practicable alternative (LEDPA). Though a preferred alternative will be selected and discussed, certain project components may not receive preference. Identify in this chapter the components of which the Authority and FRA have deferred selection.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the chapter. Example text that illustrates the concepts and methods is shown in *italics*. The methods are organized to mirror the organization of the EIR/EIS chapter and use the same format scheme for headings, text, and tables as the EIR/EIS.

Preferred Alternative Acceptance Decision

Under Authority direction, the RC shall prepare materials, coordinate, conduct, and record the Authority and Program Management Team (PMT) acceptance of, and concurrence with, the recommended preferred alternative. The objectives of this formal decision are to ensure:

- Consistency with Authority-approved engineering, construction, operations, and maintenance requirements
- Consistency with Authority-approved guidance and criteria for design
- Appropriate geographic area required to determine the significance of direct and indirect impacts, permanent and temporary impacts, beneficial and adverse impacts of HSR improvements and activities, and non-HSR physical changes that are required for HSR implementation
- Adequate area to determine potential indirect impacts of implementing mitigation measures
- Adequate area to implement, operate or maintain mitigation measures for off-site mitigation actions and mitigation sites (including relocations)

Following public circulation and the receipt of comments on the Draft EIR/EIS, the RC may refine the preliminary design plans and project description to prepare a recommended preferred alternative for administrative review by Authority and PMT staff. Any refinement of the preliminary design plans and project description must be accomplished within the project footprint approved for environmental evaluation and documented in the published Draft EIR/EIS. Any refinement of the preliminary design plans and project description shall not introduce a new direct, indirect, or cumulative significant impact (under CEQA and NEPA). As parts of preparing a recommended preferred alternative, the RC must also:

- Refresh or re-analyze time-based data (e.g., Environmental Justice American Community Survey ridership forecasts) or characteristics of the affected environment (e.g., Section 4(f) or Section 6(f) conditions) that have changed since the Draft EIR/EIS was prepared

- Revisit previous capital and operational cost estimates to determine content for Checkpoint C and the Final EIR/EIS and prepare an explanation of changes between the Draft EIR/EIS, the Checkpoint C, and the Final EIR/EIS cost estimates
- Consider the adequacy of preliminary project design and specifications for completing the EIR/EIS and environmental regulatory processes that are based upon information and actions associated with the EIR/EIS

Review of the recommended preferred alternative will be conducted by Authority and PMT Engineering, Right-of-Way, and Environmental staff. The RC will subsequently address Authority and PMT comments and produce a final version of the preliminary project design and project description for use in preparing the decision-support documents for identification of the preferred project alternative by the Authority Board of Directors and Checkpoint C concurrence (Identification of the Preliminary LEDPA) and preparation of the Final EIR/EIS. The RC will submit the final version of the preliminary project design and project description to the PMT and Authority for final review, acceptance, and concurrence signatures. Once the signature process is completed, the RC can then proceed using the approved preliminary project design, project description, and footprint for completing the preferred alternative identification, Checkpoint C concurrence, and for the Final EIR/EIS. Final administrative acceptance of, and concurrence on, the approved preliminary project design, project description, and footprint shall conclude all activities associated with preliminary project design which could alter the project footprint, accentuate environmental impacts evaluated in the Draft EIR/EIS, or lead to environmental impacts that were not evaluated in the Draft EIR/EIS.

8.1 Introduction

State the Authority and FRA's preferred alternative. Disclose environmental and non-environmental factors leading to the Preferred Alternative outcome. While most aspects of the Preferred Alternative and Station Site(s) will represent the environmentally superior outcome, explain other aspects of the Preferred Alternative that are the result of overriding policy considerations (e.g., local input, Authority policy). Identify any components for which the Authority and FRA have deferred selection. The following text from the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014) can be adapted to introduce the chapter.

This chapter identifies the Authority's and FRA's Preferred Alternative for the [section name] Section. This is a new chapter because the Draft EIR/EIS (Authority and FRA [year]) did not identify a preference among the alternatives presented. Because all the text in this chapter is newly introduced in this Final EIR/EIS, it is shown without highlighting.

The Preferred Alternative extends from [describe parameters of the preferred alternative] (show alternative alignment on Figure [figure #]). The [name] site was selected for the [name] station as part of the environmental review undertaken for the [section name] Section. The Preferred Alternative for the [project name] Section includes [xx] stations: [name the stations].

The [project name] Section EIR/EIS process has not included identification of a preferred HMF [but may include identification of a preferred terminal storage maintenance facility] site. The Authority and FRA anticipate considering the HMF [or terminal storage maintenance facility] sites evaluated in the [section name] EIR/EIS along with the [xx] HMF [or terminal storage maintenance facility] sites evaluated in this Final EIR/EIS prior to making a determination on one or more preferred sites. It is also possible that further environmental analysis may be performed. Currently, the Authority and FRA anticipate the HMF [or terminal storage maintenance facility] decision to occur after completion of the [section name] Final EIR/EIS process and decisions.

The identification of the Preferred Alternative is based on the data presented in the [project name] Section Draft EIR/EIS, including the supporting technical reports, comments received on the [project name] Section Draft EIR/EIS (the 60-day comment period concluded on [month,

day, year]), and comments provided by local communities and stakeholders in meetings held after the close of the public comment period on the Draft EIR/EIS.

The Draft and Final EIR/EIS provided information on the relative differences among physical and operational characteristics and potential environmental consequences associated with the HSR alternatives and station location options, including the following:

- Physical/operational characteristics
  - Alignment
  - Length
  - Capital cost
  - Travel time
  - Ridership
  - Constructability
- Environmental impacts
  - Transportation-related topics (air quality, noise and vibration, and energy)
  - Human environment (land use and community impacts, farmlands and agriculture, aesthetics and visual resources, socioeconomics, environmental justice, utilities and public services, hazardous materials and wastes)
  - Cultural resources (archaeological resources, historical properties)
  - Natural environment (geology and seismic hazards, paleontological resources, hydrology and water resources, and biological resources and wetlands)
  - Sections 4(f) or 6(f) properties (certain types of publicly owned parklands, recreation areas, wildlife/waterfowl refuges, and significant historical sites regardless of ownership)

In identifying a preferred alternative, the Authority was guided by the project purpose and need and project objectives described in Chapter 1, Project Purpose, Need, and Objectives, and the HSR Performance Criteria identified in Chapter 2, Alternatives, as well as by the prior work developed for and recorded in the following:

- [List studies supporting selection of preferred alternative]

These documents can be found at www.hsr.ca.gov/.

Additionally, the criteria used to identify the Preferred Alternative are consistent with Section 404(b)(1), Guidelines of the Clean Water Act (40 C.F.R. Parts 230–233), including minimizing impacts on waters of the U.S. and other sensitive environmental resources. As a result of the analyses incorporated in the Draft EIR/EIS and in the Final EIR/EIS, as well as in the biological assessment of ecosystems impacts and cultural and community impacts, the U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency (USEPA) concurred (on [month, day, year]) that the Preferred Alternative contains the LEDPA, which was identified consistent with USACE's permit program (33 C.F.R. Parts 320–331) and USEPA's Section 404(b)(1) Guidelines (40 C.F.R. Parts 230–233).

8.2 Summary of Comments

Identify the total number of comments received for the HSR section draft EIR/EIS and the range of issues and viewpoints represented in those comments. Summarize the most common types of comments, including the total number of comments in support of and opposed to the project. Include any majorities or consensus of support or opposition for specific alternatives. Identify

issuing groups or organizations and their comments. The following example text from the *Fresno to Bakersfield Section Final EIR/EIS* can be adapted to introduce this discussion.

> *During the comment period, 1,472 submissions and 3,177 comments were received on the Fresno to Bakersfield Section Draft EIR/EIS, and 783 submissions and 4,695 comments were received on the Revised DEIR/Supplemental DEIS. The comments covered a wide range of issues and represented viewpoints from government agencies, organizations, business groups, businesses, residents, and property owners.*
>
> *Most comments came from individuals in the general public who live, work, or have property interests in the project study area, or from local government jurisdictions in Kings and Kern counties. Of the 2,255 submissions, approximately 124 generally supported the project and 630 were generally opposed. The City of Fresno is in favor of the alternative through Fresno adjacent to the UPRR tracks, and the city government is working with the Authority and FRA on appropriate modifications to the city's roadway networks to accommodate the HSR project. Comments received from the general public and from local officials in Kings County stated strong opposition to any alternative that would pass through Kings County. No clear majority opinion emerged for one alternative over another in the Corcoran and Allensworth areas. Commenters provided pros and cons for each alternative in these two areas of the project.*
>
> *Comments from farmers in the Wasco-Shafter area preferred the BNSF Alternative that passed through Wasco and Shafter to the Wasco-Shafter Bypass even though they owned property along both alignments. This is because the BNSF Railway had already established the boundary to their fields and orchards whereas the Wasco-Shafter Bypass would cut across many fields and orchards and is perceived to interfere with existing agricultural operations. The City of Wasco wrote that it would prefer an alternative that goes through town on the east side of the BNSF Railway (BNSF) tracks and is opposed to the BNSF Alternative that goes through town on the west side of the BNSF tracks due to the resulting impacts on commercial and industrial activities in the city. The City of Shafter wrote that it would support the BNSF Alternative through Shafter because it more closely fits with its long-term planning vision for the city.*
>
> *Comments received from the general public and from local officials in Kern County rejected all alternatives that would include a station in Downtown Bakersfield. The majority of individual and government official comments preferred an alternative that would bypass Bakersfield and locate a station on the outskirts of the city. However, after the close of the public comment period on the Revised DEIR/Supplemental DEIS, the Bakersfield Downtown Business Association voiced support for a high-speed train station in Downtown Bakersfield.*
>
> *The effects on agricultural and private property were the most frequent concerns expressed in the comments received from the general public about the project. Also, comments expressed concern over funding availability (including whether any tax-payer money should be spent on this type of project in light of state and federal budget deficits) and the accuracy of the ridership projections. Other common environmental and community concerns included noise and vibration, ecosystem effects, neighborhood impacts, and safety.*
>
> *Many submissions suggested changing the Fresno to Bakersfield Section HSR alternatives. The most common suggestions were to consider an alignment adjacent to I-5 that would bypass the Fresno to Bakersfield Section corridor*

> *altogether or to locate the alignment along SR 99. In addition, other comments suggested a preference that the State of California use HSR funding for other infrastructure improvements. Many of these comments contended that residents of the San Joaquin Valley did not need and would not use an HSR System for travel.*

The following is the suggested organization of commenter groups:

- California legislators (e.g., congress or assembly representatives)
- Project area local governments (e.g., cities, towns, and counties)
- Federal agencies
- Tribal consultation
- State agencies
- Regional and other public agencies (e.g., economic development commissions, water districts, school districts, and irrigation districts)
- Businesses
- Organizations (e.g., special interest or community organizations)
- Individuals

8.3 Alternatives Considered

Discuss the HSR section environmental review process, including the Notice of Intent issue date and public scoping process. The following example text from the *Fresno to Bakersfield Section Final EIR/EIS* can be adapted to develop this discussion.

> *After the 2005 Statewide Final Program EIR/EIS, the Authority and FRA selected the BNSF Railway route for the Central Valley HSR between Fresno and Bakersfield to advance for further study in a second-tier, project-level EIR/EIS. Therefore, the Project EIR/EIS for the Fresno to Bakersfield Section focused on alternative alignments along the general BNSF Railway corridor.*
>
> *In addition to the first-tier decision to advance the BNSF corridor, the Authority and FRA decided to conduct a planning study for the potential location of an HSR station in the Visalia/Tulare/Hanford area before initiating project-level planning studies for the Fresno to Bakersfield Section. This study, the Visalia-Tulare-Hanford Station Feasibility Study, was initiated in 2005 and completed in 2007 (Authority and FRA 2007). The study concluded that a station east of Hanford on the BNSF Alignment would be capable of serving the Visalia-Tulare-Hanford area, and that a UPRR alternative would have greater constructability issues and greater potential noise, cultural, community, and property impacts than an alignment on the BNSF corridor.*
>
> *The Authority, in cooperation with FRA, began the environmental review process for the Fresno to Bakersfield Section of the California HSR Project, which included a Notice of Intent and Notice of Preparation (published in 2009) and a public scoping process in early 2009. The environmental review process resulted in a number of alternatives analysis reports developed in consultation with the public, federal, state, and local agencies, and community groups. For more information on the alternatives analysis process, please see Chapter 2, Alternatives, Section 2.3, Potential Alternatives Considered during Alternatives Screening Process.*

8.4 Preferred Alternative

This section identifies the Authority and FRA preferred alternative for the alignment between the [identify beginning and end points] HSR section, including the preferred station site(s) and, as appropriate, terminal storage maintenance facilities. Identify any components for which the Authority and FRA have deferred selection and indicate the anticipated segment(s) for analysis. Include a figure of the preferred alternative at sufficient scale to present the entire alternative in a single map panel. Use tables to summarize the range of impacts and visually assist the reader's comparison of alternative performance. Group impact comparison tables by natural resources (e.g., biological resources) and community resources (e.g., property acquisition, noise and vibration, transportation impacts, agricultural land conversion, visual/aesthetic resources, parks and recreation, Section 4(f)/6(f) resources). The following example and boilerplate text from the *Fresno to Bakersfield Section Final EIR/EIS* can be adapted to develop this discussion.

> *The Authority's and FRA's Preferred Alternative for the Fresno to Bakersfield Section combines the BNSF Alternative with the Corcoran Bypass, Allensworth Bypass, and Bakersfield Hybrid alternatives (Figure [figure #]). The Preferred Alternative includes the Mariposa Street Alternative for the Downtown Fresno Station (already approved as part of the Merced to Fresno Final EIR/EIS and associated decisions), the Kings/Tulare Regional Station–East Alternative, and the Bakersfield Hybrid Station for the Downtown Bakersfield Station.*[1] *This Preferred Alternative was selected based on a balanced consideration of the environmental information presented in the Draft EIR/EIS and Revised DEIR/Supplemental DEIS in the context of the California Environmental Quality Act (CEQA), the National Environmental Policy Act (NEPA), and Section 404(b)(1) requirements, local and regional land use plans, community preferences, and cost.*

The identification of the Preferred Alternative also integrates FRA's evaluation under Section 4(f) of the Department of Transportation Act (49 U.S.C. § 303) (Section 4(f)) which provides special protection to publicly owned public parks; recreational areas of national, state, or local significance; wildlife or waterfowl refuges; and lands of an historic site of national, state, or local significance. As described in Chapter 4, Sections 4(f)/6(f) Evaluation, Section 4(f) properties can only be used by federally funded transportation projects if there is no feasible and prudent alternative and all possible planning has been taken to minimize harm to any 4(f) property used by the project. For more information on FRA's evaluation under Section 4(f), please see Chapter 4.

> *The Preferred Alternative is estimated to cost approximately $7.1 billion (in 2010 dollars). The Preferred Alternative would have lower capital costs than the BNSF Alternative, which is estimated at $7.7 billion. The alternative with the lowest capital cost ($6.9 billion) consists of segments of the BNSF Alternative in combination with the Allensworth Bypass and Wasco-Shafter Bypass alternatives.*

This section describes how the Authority and FRA identified the Preferred Alternative that the agencies believe would fulfill their statutory missions and responsibilities by giving consideration to economic, environmental, technical, and other factors. FRA and the Authority identified the Preferred Alternative by balancing the adverse and beneficial impacts of the project on the human and natural environment. Taking this holistic approach means that no single issue was dispositive in identifying the Preferred Alternative in any given geographic area. FRA and the Authority weighed all of the issues including natural resource and community impacts, the input

[1] Because only one HMF site will be required for the HSR System and that site may be located in adjacent project sections, it was premature to identify a Preferred Alternative HMF site in the Fresno to Bakersfield Section Final EIR/EIS. The HMF decision will be made separately from the identification of the preferred alignment and station alternatives in the Fresno to Bakersfield Section EIR/EIS.

of the communities along the route, the views of federal and state resource agencies, project costs, and constructability to identify what both agencies believe is the best alternative to achieve the project's purpose and need.

This evaluation provides information on the environmental topics where the alternatives are substantively different and does not focus on resource topics where the potential impacts for the alternatives are similar (e.g., air quality and global climate change, safety and security, electro-magnetic fields and interference, station planning, and archaeological and paleontological resources) or were not significant (e.g., hydrology, public utilities and energy, geology, soils and seismicity, and hazardous materials and waste).

Table 8-1 summarizes the potential impacts on natural resources (i.e., impacts on aquatic resources and special-status species) for easy comparison. Table 8-2 summarizes the potential impacts of the project alternatives on community-based resources, including impacts on farmlands, visual impacts, potential displacements, and environmental justice considerations. The color coding provided in the tables signifies a relative range of impacts that would be substantially higher (represented by red), average (yellow), or substantially lower (green). The color codes offered the resource specialist a method of integrating a professional, qualitative judgment with the quantity of impacts. For instance, when the affected resources varied more by habitat value than by acres, the color code reflects the value of impacts applied using professional judgment rather than only quantities.

Table 8-1 Natural Resources Impacts in the Fresno to Bakersfield Section (example only)

Parameter	Alternatives		Common Components
	Preferred Alternative	BNSF Alternative	
Aquatic Resource Direct Impacts a			
Wetlands Impact (waters of U.S.)	9.35	18.84	1.42
Other Waters of the U.S. Impact	141.79	140.33	30.95
Total Direct Impacts to Aquatic Resources (Waters of the U.S.) (acres)a	*151.14*	*159.16*	*32.37*
Riparian Habitat (direct impact, acres)	3.24	4.33	-
Permanent Impact to Special-Status Plant Species Habitat (acres)	453.17	402.44	62.98
Permanent Impact to Special-Status Wildlife Species Habitat (acres)	4,676.78	4,763.18	1,090.40

Color Coding Key:
Red - Substantially higher impacts
Yellow - Average impacts
Green - Substantially lower impacts
[a] The acreage impacts include direct permanent and temporary impacts.

Table 8-2 Community Resource Impacts in the Fresno to Bakersfield Section (example only)

Parameter	Alternatives		Common Components
	Preferred Alternative	BNSF Alternative	
Section 4(f) Properties Impacted by Project	3	3	1
Transportation and traffic (permanent road closures)	53	46	24
Noise-sensitive receptors affected after mitigation	1,096	1,070	71
Important Farmland (acres)	3,472	3,541	788
Prime Farmland (acres)	1,747	1,747	325
Williamson Act lands (acres)	1,698	2,096	270
Confined-animal facilities affected	18	18	1
Parks, recreation, open space: before mitigation (with mitigation)	5(3)	6(4)	-
Visual quality in rural areas affected	Yes	Yes	Yes
Visual quality in urban areas affected	Yes	Yes	Yes
Number of historic properties affected–direct(indirect)	6(15)	7(12)	4(9)
Oil wells	18	15	-
Key community facilities affected	7	10	1
Displacement of religious facilities (parcels affected)	3(2)	6(5)	-
Division of Ponderosa Road/Edna Way community	Yes	Yes	No
Division of Newark Ave and 5th Ave/Waukena-Corcoran community	Yes	No	No
Division of Community of Crome	Yes	Yes	No
Disproportionate effects on EJ communities	Yes	Yes	Yes
Estimation of no. of commercial and industrial businesses displaced	395	416	63
Estimation of no. of housing units displaced	405	460	39

Color Coding Key:
Red - Substantially higher impacts
Yellow - Average impacts
Green - Substantially lower impacts

Preferred Alternative Acceptance Decision

Following the description of the preferred alternative and summary impact tables, summarize the results of the administrative decision to accept the preliminary project design and description of the proposed preferred alternative. Describe the purpose, determination, participants, and date of the administrative decision.

8.4.1 Alignment

Provide a comparative description of the distinguishing impact performance of the preferred alternative and the other EIR/EIS alternatives. Discuss only the resources with significant impacts and note that resources with less than significant impact or where the impacts were common among the alternatives are not included in the discussion. Identify the impacts associated with the alternatives reviewed by geographic segment in order from the section origin city. Describe the impacts similar for all alternatives and impacts that differentiate the alternatives. Conclude the discussion for each resource with a statement identifying the alternative with the more significant impact on the resource and a quantitative or qualitative metric used for the comparison.

8.4.2 Station Site(s)

Identify the Authority and FRA’s identified preferred station location(s) and explain the rationale for the location(s).

8.4.3 Maintenance Facility (as applicable)

Identify the Authority and FRA’s identified preferred alternative for the heavy maintenance facility or terminal storage and maintenance facility, as applicable to the HSR section. Identify any components for which determination has been deferred and indicate the anticipated segment(s) for analysis.

8.5 Environmentally Superior Alternative

The CEQA guidelines (Section 15126.6(e) (2)) state that if the environmentally superior alternative is the No Project Alternative, then the EIR must also identify an environmentally superior alternative among the other alternatives. For the reasons described in this Final EIR/EIS, the environmentally superior alternative is not the No Project Alternative. The HSR alternatives would provide benefits, such as reducing vehicle trips on freeways and reducing regional air pollutants, which would not be realized under the No Project Alternative. CEQA does not require identification of an environmentally superior alternative. Nevertheless, the Preferred Alternative is the environmentally superior alternative. Implementing the high-speed rail project between [segment end cities] will have adverse environmental impacts regardless of which alternative is selected but, overall, the Preferred Alternative provides the environmentally superior alternative by best meeting environmental regulatory requirements and best minimizing impacts on the natural environment, farmland, and communities.

8.6 Environmentally Preferable Alternative

The environmentally preferable alternative is a NEPA term for the alternative that will promote the national environmental policy as expressed in NEPA's Section 101. Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative that best protects, preserves, and enhances historic, cultural, and natural resources. As required by the regulations implementing NEPA, the FRA will identify the environmentally preferable alternative in its ROD for the Fresno to Bakersfield Section.

8.7 Least Environmentally Damaging Practicable Alternative

The Authority, FRA, and STB are working closely with federal, state, and regional agencies to meet regulatory requirements by refining the [section name] Section alternatives to avoid and minimize impacts and, where necessary, to reach agreement on mitigation measures for impacts that cannot be avoided. Two important processes that integrate many of the applicable regulatory requirements are Section 404 of the Clean Water Act and Section 408 of the Rivers and Harbors Act, as managed by the USACE with oversight from USEPA. These laws authorize the

USACE to make permit decisions regarding the discharge of dredged or fill material into waters of the U.S. and alterations or modifications to existing federal flood risk management facilities. To coordinate decision-making, the Authority and FRA entered into a NEPA/Section 404/Section 408 Integration Process Memorandum of Understanding (MOU) with USACE and USEPA (FRA et al. 2010). The MOU outlines three major checkpoints in the integration of the NEPA, Section 404 and Section 408 processes. Each checkpoint consists of the submittal of technical data and studies by the Authority and FRA to USACE and USEPA for review and consideration prior to issuing a formal written agency response. The first of these submittals is Checkpoint A, which involves preparing a project purpose statement that duly serves NEPA and Section 404 requirements. USEPA concurred on the [section name] Section purpose and need on [month day, year], and USACE concurred on the purpose and need on [month day, year] to satisfy Checkpoint A. The second submittal is Checkpoint B, which is required to screen and reduce the potential project alternatives to an appropriate range of "reasonable" and "practicable"[2] alternatives using the best available information. On [month day] and [month day, year], USACE and USEPA, respectively, provided letters on the alternatives that the Authority and FRA proposed to carry through the EIR/EIS. Both agencies concurred on the range of alternatives to be carried forward in the [section name] Section EIR/EIS.

Finally, Checkpoint C consists of the assembly and assessment of information contained in the EIR/EIS and associated technical studies for consideration by USACE and USEPA in determining the preliminary LEDPA and providing a formal agency response. The documentation includes those analyses completed to meet requirements of NEPA, Sections 401 and 404 of the Clean Water Act, and Section 14 of the Rivers and Harbor Act, which include consideration of compliance with the federal Endangered Species Act and the National Historic Preservation Act. The Authority submitted Checkpoint C materials to the USACE and USEPA on [month day, year] and received concurrence from the agencies that the Preferred Alternative contains the preliminary LEDPA on [month day, year].

All materials prepared for the checkpoint are available on the Authority's website at www.hsr.ca.gov.

Should additional coordination occur during the checkpoint process, the HSR RC should identify any documents and agency concurrence, as applicable for completeness of the checkpoint process.

8.8 Products

The RC is responsible for preparing the following products, under Authority and FRA direction, according to PMT guidance and subject to PMT quality control and assurance.

8.8.1 Project Final EIR/EIS Volume 1

1. Summary for EIR/EIS Executive Summary
2. Preferred Alternative and Station(s) Chapter 8 for the EIR/EIS
3. Preferred Alternative Acceptance Decision

The Preferred Alternative and Station(s) chapter for the EIR/EIS will identify the Authority and FRA's Preferred Alternative and station(s) for the HSR section and provides evaluation of the preferred alternative identification process.

[2] "Practicability" is defined as available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purposes (40 C.F.R. § 230.10(a)(2)).

8.9 Chapter 8—Preferred Alternative and Station(s) EIR/EIS Outline

The RC shall use the following outline for organizing Chapter 8 of the summary description in the Draft EIR/EIS and the complete chapter content in the Final EIR/EIS, using the heading hierarchy and format as indicated.

Chapter 8 Preferred Alternative and Station Site(s)
8.1 Introduction
8.2 Summary of Comments
    8.2.1 California Legislators
    8.2.2 Project Area Local Governments
    8.2.3 Federal Agencies
    8.2.4 Tribal Consultation
    8.2.5 State Agencies
    8.2.6 Regional and Other Public Agencies
    8.2.7 Businesses
    8.2.8 Organizations
    8.2.9 Individuals
8.3 Alternatives Considered
8.4 Preferred Alternative
    8.4.1 Alignment in Segment 1
    8.4.2 Alignment in Segment 2
    8.4.3 Alignment in Segment N, etc.
    8.4.4 Station Site #1
    8.4.5 Station Site #2
    8.4.6 Station Site #N, etc.
8.5 Environmentally Superior Alternative
8.6 Environmentally Preferable Alternative
8.7 Least Environmentally Damaging Practicable Alternative

9 PUBLIC AND AGENCY INVOLVEMENT

This chapter is designed to guide the HSR Regional Consultant (RC) on presenting the California High-Speed Rail Authority's (Authority) and the Federal Railroad Administration's (FRA) public and agency involvement activities. The activities will be in accordance with a comprehensive public, stakeholder, and agency outreach plan prepared by the RC for review and approval by the Authority and Program Management Team (PMT). The outreach plan must include strategies and tactics for involving people outside of agencies or decision-making roles, including the minimum of three general public or stakeholder meetings during each appropriate stage in the environmental impact report/environmental impact statement (EIR/EIS) process for the HSR section/project: scoping, alternatives analysis, preparation of the Draft EIR/EIS, review of and comment on the Draft EIR/EIR.

The Authority and PMT will provide the RC with: (1) oversight and procedures for conducting meetings and consultations and (2) agenda, notes, summaries, and other documentation from Authority- and PMT-initiated meetings. Similarly, the RC is responsible for furnishing all meeting/consultation records to the Authority. The RC also has an obligation to obtain records from the Authority for any project-related meetings where the RC itself may not have attended.

Practical guidance and usable content are provided. Guidance is shown in black text, tables, and illustrative graphics. Usable "boilerplate" content is shown in red text and can be copied verbatim or with refinement, as appropriate, into applicable areas within the chapter. Example text that illustrates the concepts and methods is shown in *italics*. The methods are organized to mirror the organization of the EIR/EIS chapter and use the same format scheme for headings, text, and tables as the EIR/EIS. Review the most recent HSR section/project EIR/EIS for examples of practice and documentation.

The purpose of this chapter is to provide a centralized summary of and reference to detailed information related to public and agency involvement. Begin the chapter with a reference table to outreach, involvement, and communications activities, and Memoranda of Understanding or other agreements on coordination and consultation associated specifically with resources/topics in EIR/EIS Chapter 3 (e.g., 3.12, Socioeconomics and Communities, 3.17, Cultural Resources and Section 106); Chapter 4 Sections 4(f) and 6(f); and Chapter 5, Environmental Justice. Provide an overview of the legal and policy framework, and general procedures for public and agency outreach. The following text, derived from the *Fresno to Bakersfield Final EIR/EIS* (April 2014), may be adapted to introduce this chapter in other HSR section EIR/EIS documents:

Pursuant to the requirements of the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA), the Authority and FRA, as lead agencies, conducted a public and agency involvement program as part of the environmental review process. This chapter describes the public and agency involvement efforts conducted in the preparation of this *[section name] Section Draft EIR/EIS.* The public and agency involvement program includes the following efforts:

California High-Speed Train Authority Website

Information on HSR project activities, including meeting notices and publications, are available on-line at: www.hsr.ca.gov

- Public involvement and outreach—informational materials, including fact sheets; informational and scoping meetings, including town hall meetings, public and agency scoping meetings, meetings with individuals and groups, presentations; and briefings
- Agency involvement—agency scoping meetings, interagency working group, meetings with agency representatives, and other agency consultation
- Notification and circulation of the *[section name] Section Draft EIR/EIS*

In addition, the Authority posts meeting notices and public documents on its website, www.hsr.ca.gov. The site includes information about the high-speed rail (HSR), the proposed HSR route, the Authority's updated Final Business Plan, newsletters, press releases, board of directors meetings, recent developments, status of the environmental review process, Authority contact information, and related links. The Authority Board of Directors meetings are open to the public, and one of the first items on the meeting agenda is to provide an opportunity for public comment on any public agenda item.

Upon the release of the *[section name] Section Draft EIR/EIS*, the Authority posted the document in its entirety on the above website. In addition, materials (in English and [other language(s)]) on how to participate in the public comment period and navigate the extensive document were also available online.

Throughout the environmental process, some of the most frequently asked questions related to [HSR Section specific information]. Other commonly asked questions received via email, phone calls, public information meetings, and one-on-one discussions with landowners included [HSR Section specific information]. Project staff addressed these and other questions, often referring to the environmental analysis already underway for the Project EIR/EIS and informing people of upcoming opportunities to make comments. Once the *[section name] Section Draft EIR/EIS* was available, the public was directed to the appropriate chapter(s) that addressed their question(s). Project staff also assessed impacts of other alternatives or changes that individuals and organizations had suggested. Outreach staff logged unanswered questions for direct follow-up with the individual or organization that had inquired or as items to be addressed at future meetings. Upon request, project staff offered to provide meetings and briefings.

9.1 Environmental Justice Outreach

- Identify the groups contacted for environmental justice outreach and the purpose of the outreach.
- Identify the sources of reference data.
- Cross reference with Environmental Justice, Chapter 5.

The Authority conducted specific outreach efforts to low-income and minority populations and to communities of concern. The purpose of this outreach was to increase the Authority's and FRA's understanding of potential project effects upon these populations. Environmental justice populations were identified using [year based on Environmental Justice, Chapter 5.0] data from the U.S. Census Bureau. The *[section name] Section: Community Impact Assessment Technical Report* contains a list of environmental justice-related interest groups that have been engaged through outreach efforts (Authority and FRA [year]).

Identify the Authority's contact with groups of interest in environmental and economic social justice issues and established minority organizations, as well as other civic and group leaders and elected officials.

Materials for public meetings hosted by the Authority were translated into Spanish, Spanish language interpreters were available at all public information meetings, and Spanish-language materials were posted to the website.

Identify any other languages in which translations of the materials or interpreters were available.

For additional information about environmental justice outreach to low-income and minority populations and communities of concern, see Chapter 5.0, Environmental Justice. Table 9-1, which is provided at the end of this chapter, lists the meetings held as part of the Authority's outreach effort, both during and after scoping.

9.2 Public and Agency Scoping

Public scoping is an important element in the process of determining the focus and content of an EIR/EIS and provides an opportunity for public involvement. Scoping helps identify the range of actions, alternatives, environmental effects, and mitigation measures to be analyzed in depth. It also helps focus detailed study on those issues pertinent to the final decision on the proposed project.

Refer to information reported in Section 3.0.1.0, Outreach to Local Agencies, which requires the RC to meet with staff of local public agencies within the HSR sections to ensure the EIR/EIS properly reflects the local, on-the-ground conditions and appropriately analyzes impacts. While initial contact with local agencies may occur during scoping, the Authority expects the RC to work with agencies on a continuing basis to identify, discuss, address, and document these efforts so that the results can be incorporated into the EIR/EIS. Likewise, the RC is to work closely with the Authority's Regional Director and other Authority management to identify and include in the environmental document information from meetings where the RC itself may not have been present.

9.2.1 Notices of Preparation, Notices of Intent, and Public Information Materials

Identify date and publication/distribution for the Notice of Intent (NOI) and Notice of Preparation (NOP). Reference the State Clearinghouse number for the NOP. Note any amendments to these.

9.2.2 Scoping Meetings

The public is encouraged to provide input throughout the environmental review process. As part of public outreach for the [section name] Section, [# of meetings] public and agency scoping meetings were held between [month day] and [month day, year] in [location, location, location] in the [section name] Section corridor.

Identify the total number of individuals, including agency representatives, elected officials, and members of the media that attended the meetings.

The scoping meetings held in [month year] for the *[section name] Section Draft EIR/EIS* are an important component of the scoping process for both the state and federal environmental review. Information from the scoping meetings is available online at www.hsr.ca.gov.

All meetings were held between 3 p.m. and 7 p.m. to allow representatives from agencies and the public the opportunity to participate. The format of the scoping meetings was an open house, which allowed people to arrive at any time to obtain information and provide input. Agendas, fact sheets, and scoping period comment sheets were distributed at the scoping meetings. The comments received at the meetings were documented and are summarized below and in the *Draft Scoping Report: [section name] Section* (Authority and FRA [year]).

Identify the number of recipients of direct mail announcements regarding the public scoping meetings and that public scoping meeting announcements were posted on the Authority's website.

The direct mail recipients were members of the public identified as stakeholders, impacted property owners, and those who attended meetings or submitted comments and questions. Local newspapers published advertisements of the meetings, and local media outlets received press releases.

Summarize the number and membership of the attendees (e.g., general public, agency and local government representatives, media, elected officials) and the number of comments received.

List the places and dates of the public and agency scoping meetings.

In addition to these formal scoping meetings, public input on the scope of the environmental review was sought through other means, including presentations, briefings, and workshops.

Table 9-1, provided at the end of this chapter, lists the meetings held as part of the lead agencies' outreach effort. Comment cards were distributed at meetings with the option to be mailed, email notifications were sent alerting stakeholders of the opening of the public comment period, and a press release was issued to encourage participation and public comments at the public hearings.

9.2.3 Scoping Comments

The scoping meetings and comments received on the NOI/NOP helped the lead agencies identify general environmental issues to be addressed in the [section name] Section Draft EIR/EIS. The [section name] Section scoping process identified issues with the proposed alignments and stations, suggestions for new or modified alignments and stations, and issues of potential concern (listed below) related to the proposed project. The scoping period for the environmental process occurred from [month day] to [month day, year].

Briefly summarize comment topics (e.g., location of alignment and facilities, economic, resource categories, displacement). Bullets may be used to show the types of generic comments. The following example is from the *Fresno to Bakersfield Section Revised DEIR/Supplemental DEIS* (July 2012),

> *Environmental, cost and financing, transportation, and other issues mentioned in scoping comments included the following:*
>
> - *Location of HSR stations and alignment*
> - *Rail consolidation*
> - *Location of the heavy maintenance facility*
> - *Power source and system requirements*
> - *Air quality, congestion, and economic benefits*
> - *Economic growth*
> - *Connections to local transit*
> - *Benefits/impacts on local businesses*
> - *General support for the project*
> - *Employment opportunities*
> - *Fast tracking of the project*
> - *Ridership estimates*
> - *Agricultural impacts*
> - *Property acquisition*
> - *Natural resource impacts*
> - *Displacement of people*
> - *Noise impacts*
> - *Potential devaluation of property*
> - *Cost and financing of the HSR System*
> - *Use of domestic labor and products for construction*

Reference the Scoping Report and its location. Summarize the most common types of comments, including the total number of comments in support of or opposed to the project. Include any majorities or consensus for specific alternatives. Identify issuing groups or organizations and their comments.

9.3 Alternatives Analysis Process

Introduce the components of the alternatives analysis process.

The alternatives analysis process uses conceptual planning and environmental and engineering information to identify feasible and practicable alternatives to carry forward for environmental review and preliminary engineering design in the [section name] Section Draft EIR/EIS.

Identify all alternatives analysis reports prepared for the HSR section. Reference the programmatic documents (e.g., 2005 Statewide Program EIR/EIS) and feasibility studies. Describe the primary alternatives considered for the HSR section based on these documents. Identify any alternatives developed during the scoping process.

With consideration of the public and agency comments received during the planning and initial scoping processes, various design options to the main alternatives for HSR alignment, station and maintenance facility sites were considered and are detailed in the *[section name] Section EIR/EIS Preliminary Alternatives Analysis Report* [section name] (Authority and FRA [year]). This Preliminary Alternatives Analysis Report [section name] is intended to identify the range of potentially feasible alternatives to analyze in the EIR/EIS. It documents the preliminary evaluation of alternatives, indicating how each of the alternatives would meet the purpose for the HSR project, how evaluation criteria were applied and used to determine which alternatives to carry forward for preliminary design and detailed environmental analysis, and which alternatives should not be carried forward for further analysis.

Note that public and agency comments received during feasibility studies, the NOI/NOP comment period, and ongoing interagency coordination and public information meetings helped to identify the initial alternatives carried forward.

Public and agency input on issues to be studied, city and county transportation, land use and planning information, and input on the range of alternatives provided valuable information to assist in evaluating the alternatives.

Summarize the process for any technical working groups (TWG) and the outcome of their meetings. Summarize the alternatives carried forward in the EIR/EIS. Identify the documents reviewed, the specific alternatives introduced, and the date of Authority Board confirmation of alternatives.

9.3.1 Public Information Meetings and Materials during the Alternatives Analysis Process

Public information meetings were held during the alternatives analysis process to inform the public about the [section name] Section alternatives analysis recommendations. Various meeting formats, such as open houses, formal presentations, and question and comment sessions, were used to present information and provide opportunities for input by participants. Project information and announcements were posted on the Authority's website. See Table 9-1 at the end of this chapter for a list of public meeting dates and topics.

List the alternative analysis reports and identify that they were prepared to: provide information to the public regarding the alternatives analysis process, the initial range of alternatives considered, and the criteria for evaluating those alternatives. Detailed information displays about the alternatives analysis process were also provided at public meetings, as well as updates to the alignment. In addition to the public information meetings, one-on-one briefings and small group meetings were held throughout the process. Another element of the outreach was to provide updates and presentations to clubs, organizations, farm bureaus, and business owners, as well as to the counties of [names of counties] and the cities of [names of cities] to facilitate an inclusive and transparent process.

Identify the common comments that resulted from the outreach. Note the location of electronic (or hard) copies of the alternatives analyses.

Table 9-1, provided at the end of this chapter, lists the public outreach meetings associated with the lead agencies' ongoing outreach efforts.

9.3.2 Technical Working Group Meetings during the Alternatives Analysis Process

Discuss the purpose and composition of the TWG formed by the Authority. Reference Table 9-1, which should include all TWG meeting dates and topics.

Note that at conclusion of the scoping period the initial range of alternatives were developed and reviewed by the TWG.

These TWGs provided input on the alternatives and information about city and county land use, transportation and other planning projects, as well as updates to their boards or councils.

Discuss continued TWG alternatives analysis review and any additional participants. Discuss the timing of release of the alternatives analysis reports and TWG meetings.

9.3.3 Environmental Resource Agency Meetings during the Alternatives Analysis Process

Discuss the purpose and type of feedback developed through the Environmental Agency TWG. Summarize the environmental concerns raised during the meetings.

9.4 Development of the Draft EIR/EIS

During the development of the [section name] Section Draft EIR/EIS, the Authority and FRA held meetings to consult with federal, state, and local agencies and to provide project updates and obtain feedback from the public. The following subsections provide details of these activities.

Identify any materials distributed during meetings. Reference and use Table 9-1 to summarize the topics discussed during the meetings. For each subsection, identify the timing and purpose of the meetings. Describe the meeting format. Cross reference the discussion back to previous sections of the chapter for Public Information Materials and Meetings and TWG information.

Divide the discussion into the following subsections.

9.4.1 Outreach, Involvement, and Communications Guidance

Summarize the outreach, involvement, and communications that were specific to sections of the EIR/EIS (e.g., Chapter 3 resources (e.g., 3.12, Socioeconomics and Communities, 3.17; Chapter 4, Section 4(f) and 6(f); Chapter 5, Environmental Justice) and provide references to the lowest section header numbers where content is presented in respective sections.

9.4.2 Agreements and Memoranda of Understanding

Summarize any memoranda of understanding or agreements on coordination and consultation.

9.4.3 Public Information Materials and Meetings

The Authority and FRA held informal and formal public meetings during the [section name] Section Draft EIR/EIS preparation process. Various meeting formats, such as open houses, formal presentations, and question and comment sessions, were used to present information and provide opportunities for input by participants. Project information and announcements were posted on the Authority's website (www.hsr.ca.gov). Table 9-1, provided at the end of this chapter, lists the public meeting dates and topics.

Public information meetings were held during preparation of the EIR/EIS to inform the public about the alternatives analysis recommendations for the [section name] Section and the status of the EIR/EIS preparation. In addition, these meetings provided information on various HSR project components and served as forums for obtaining feedback. The public information meetings included brief presentations and project information materials (on display and in fact sheets); project staff were available to answer questions. Meetings were announced through direct mail to those on the project database, advertisements in local newspapers, and postings on the

Authority's websites (www.hsr.ca.gov). Various publications and materials were also made available at this website.

The Authority participated in additional public meetings hosted by other agencies to provide project information and obtain feedback. The places and dates of these meetings are listed in Table 9-1, provided at the end of this chapter.

9.4.4 Tribal Coordination Meetings

Identify the dates the Authority met with the State Historic Preservation Officer (SHPO) and Advisory Council on Historic Preservation (ACHP). Discuss any agreements or modifications to existing programmatic agreements. Identify the date of contact and initiation of consultation to the Native American Heritage Commission (NAHC) and Native American tribes. Identify the number of tribes contacted and dates and attendance of tribes at any coordination meetings. Summarize the common comments received or discussed. Summarize any additional meetings, conference calls, or workshops conducted as part of the consultation with tribes. Reference Section 3.17, Cultural Resources, of the Draft EIR/EIS for a more thorough discussion of the outreach efforts.

9.4.5 Technical Working Group Meetings

The TWGs continued to meet regularly during the [section name] Section Draft EIR/EIS preparation process to facilitate information exchanges about modifications to alignments selected for analysis in the EIR/EIS, HSR station and alignment design details, and identification of potential resource impacts and avoidance alternatives. The TWG meetings helped transfer information needs, express concerns and preferences, and relay important project updates. Table 9-1, at the end of this chapter, lists the public meeting dates and topics.

9.4.6 Agency Meetings and Consultation

The Authority and FRA consulted with cooperating federal, state, and local agencies under NEPA and with trustee and responsible agencies under CEQA regarding specific resource areas associated with these agencies. Interested state, federal, and local agencies were also consulted throughout the process.

List the dates, topics, and participants of statewide agency, environmental resource agency, or any specific resource topic (e.g., biological survey methodology) meetings. List the participating federal, state, regional, and local agencies. Identify participating and cooperating agencies under NEPA.

9.5 Notification and Circulation of the Draft EIR/EIS

Notice regarding the availability and the circulation of this [section name] Section Draft EIR/EIS was provided pursuant to CEQA and NEPA requirements in both English and Spanish. Notice included publication of an announcement in newspapers that have general circulation in areas potentially affected by the proposed project. The announcement indicated the availability of the [section name] Section Draft EIR/EIS, the time and location of workshops, public hearings, where the document could be viewed, and the period during which public comment would be received. A letter, informational brochure, fact sheet, and notice of availability were made available in English and Spanish and mailed to those within a 300-foot buffer to all permanent impacts associated with the alignment. In addition, a postcard in English and Spanish was mailed to additional stakeholders who indicated their interest in the project and had requested to be kept informed. Also, an e-mail blast was released. A notice of completion indicating the availability of the [section name] Section Draft EIR/EIS was filed with the State Clearinghouse and sent to state agencies. The U.S. Environmental Protection Agency (USEPA) published a notice of availability for the [section name] Section Draft EIR/EIS in the Federal Register on [month day, year]. In

addition, several dozen notices were displayed at businesses and public gathering places, such as post offices and Amtrak stations within the alignment.

The [section name] Section Draft EIR/EIS was circulated among federal, state, and local agencies, regional transportation agencies, and organizations and persons who had expressed an interest in the project. The [section name] Section Draft EIR/EIS is available on the Authority and FRA's websites and on compact disc upon request. Public hearing dates and locations also are posted on the Authority's website. A distribution list for the [section name] Section Draft EIR/EIS is provided in Chapter 10, EIR/EIS Distribution.

9.6 Publication and Review of the Draft EIR/EIS [for Final EIR/EIS only]

The [section name] Section Draft EIR/EIS was posted on the Authority's website for public review on [month day, year], and was formally made available to California state agencies by the State Clearinghouse beginning [month day, year]. The public comment period ran from [month day] to [month day, year] for a total of [##] days after the document was first published for public review and comment.

In order to provide the greatest opportunity for agencies and the public to review and comment on the Draft EIR/EIS, the Authority and FRA provided widespread notice of its availability.

Summarize the dates of any press releases published in regional and major newspapers.

9.6.1 Public and Agency Information Meetings and Hearings [for Final EIR/EIS only]

Identify the location, date, and time for public and agency meetings, workshops, and hearings. Detail the activities conducted at the meetings, workshops, and hearings.

The [section name] Section Draft EIR/EIS was made available for review in several ways. The document was posted on the Authority and FRA's websites, beginning on [month day, year].

Identify the location and availability of electronic and hard copies of the Draft EIR/EIS.

9.6.2 Comments on the Draft EIR/EIS [for Final EIR/EIS only]

In order to provide the greatest opportunity for agencies and the public to review and comment on the Draft EIR/EIS, the Authority and FRA provided widespread notice of its availability. On [month day, year], the Authority sent a press release to all major newspapers in the area advising the public of the availability of the Draft EIR/EIS on the Authority's website. As required by law, notices were placed in newspapers of general circulation in the area and in the *Federal Register*.

The public was given the opportunity to comment in several ways. Comments could be submitted to the Authority and FRA by card or letter (including cards and letters submitted at the public hearings), through the Authority website, verbally at the three public hearings, and by means of e-mail. During the comment period, there were [###] comment submittals on the [section name] Section Draft EIR/EIS.

The Authority and FRA assessed and considered all substantive comments on the Draft EIR/EIS that were received by the close of the comment period and included a response, where necessary, in the Final EIR/EIS. Responses to comments received from [month day, year], through [month day, year], are available in [volume number]. A summary of comments received is provided below.

Summarize the number of comments received of general support or general opposition. Summarize the membership of the commenter (e.g., residents, employed persons, property owners). Summarize any alternatives that received a majority of support or opposition and resource areas of greatest comment. Summarize any suggestions offered in comments.

Within this section, summarize comments by:

- Alternative
- Station
- Agencies, organizations, and interest groups (e.g., federal agencies and tribes, California legislators, regional and public agencies, cities and counties, business groups, individuals)

Summarize comments under specific alternatives or groups. Identify the number of comments and summarize the opinions. Note if specific alternatives or components of alternatives did not receive comment.

Identify any subsequent information meetings or workshops that resulted after close of the comment period.

9.6.3 Response to Common Comments [for Final EIR/EIS only]

This introduction explains the method used for responding to comments, as well as the organization of the responses to comments on the [section name] Section Final EIR/EIS. Written responses to public comments received between [month day, year] and [month day, year] are provided in [volume number] of this EIR/EIS. The comments received after [month day, year], were considered, but have not been responded to individually. Those comments are included in [Table X of Volume X] of the EIR/EIS.

The Authority reviewed the comment transmittals and their attachments, identifying individual issues to which the comments pertained. After identifying the individual comments within the cards, letters, verbal transcripts, and e-mails, the Authority grouped individual comments by resource issue and assigned each set of comments to technical experts in the appropriate disciplines to prepare a response. After reading through their assigned comments, the technical experts grouped the individual comments by resource topic and prepared draft responses. Before completion of the Final EIR/EIS, senior-level experts then reviewed each response to ensure technical and scientific accuracy, clarity, and consistency and to ensure that the response addressed the comment.

Where multiple commenters submitted essentially the same comment, the Final EIR/EIS grouped those comments and provided a single master response. Chapter [X] of Volume [X] provides a summary of the comment themes and the master responses, as well as a list of the comment numbers that the responses are intended to address. When reading the comments submitted, a reference to find the master response is provided. In other cases, a custom response is provided in the comment submittals. The master responses shown in Chapter [X] of Volume [X] are organized first by general themes and then by EIR/EIS section (purpose/need, alternatives, environmental resource, etc.).

Where appropriate and consistent with CEQA and NEPA, the Final EIR/EIS responds to the significant environmental issues that have been raised by commenters without necessarily responding to each individual comment. As required under CEQA and NEPA, the comments received are included and the commenters identified in Volume [X] of this EIR/EIS.

California Public Resources Code Section 21091(d)(1) and (d)(2) provides the basis for this approach under CEQA:

> (d) (1) The lead agency shall consider comments it receives on a draft environmental impact report, proposed negative declaration, or proposed mitigated negative declaration if those comments are received within the public review period.
>
> (2) (A) With respect to the consideration of comments received on a draft environmental impact report, the lead agency shall evaluate comments on environmental issues that are received from persons who have reviewed the draft and shall prepare a written response

> pursuant to subparagraph (B). The lead agency may also respond to comments that are received after the close of the public review period.
>
> (B) The written response shall describe the disposition of each significant environmental issue that is raised by commenters. The responses shall be prepared consistent with California Code of Regulations, Title 14, Section 15088 as those regulations existed on June 1, 1993.

Section 14(s) of the FRA's Procedures for Considering Environmental Impacts (64 Fed. Reg. 28545) validates this approach under NEPA.

> (s) In a final EIS, a compilation of all responsible comments received on the draft EIS, whether made in writing or at a public hearing, and responses to each comment. Comments may be collected and summarized except for comments by Federal agencies and where otherwise required by Federal law or regulation. Every effort should be made to resolve significant issues before the EIS is put into final form. The final EIS should reflect such issues, consultation and efforts to resolve such issues, including an explanation of why any remaining issues have not been resolved.

9.7 Preferred Alternative Acceptance Decision

Under Authority direction, the HSR RC shall prepare materials, coordinate, conduct, and record the Authority and PMT acceptance of, and concurrence with the recommended preferred alternative.

Following public circulation and the receipt of comments on the Draft EIR/EIS, the RC may refine the preliminary design plans and project description to prepare a recommended preferred alternative for administrative review by Authority and PMT staff. As parts of preparing a recommended preferred alternative, the RC must also refresh or re-check outreach and contacts that have changed since the Draft EIR/EIS was prepared.

9.8 Log of Public and Agency Meetings

The preceding subsections should reference a table at the end of the chapter.

List all meetings in a table. The following example is from the *Fresno to Bakersfield Section Final EIR/EIS*.

Table 9-1 Public and Agency Meetings (example only)

Date of Meeting	Meetings Held from [month year] to [month year]	Topic
3/16/2007	Cities of Fresno, Selma, Fowler, Kingsburg	Educate elected officials on HSR.
4/29/2007	Association of Environmental Professionals (AEP) State Conference	General presentation on HSR in California.
5/30/2007	Fresno Area Stakeholders	General presentation on HSR in the CV and questions and answers (Q&A).

9.9 Products

The RC is responsible for preparing the following products, under Authority and FRA direction, according to PMT guidance and subject to PMT quality control and assurance.

9.9.1 Project EIR/EIS Volume 1

1. Summary for EIR/EIS Executive Summary
2. Public and Agency Involvement Chapter 9 for the EIR/EIS
3. Public, Stakeholder, and Agency Outreach Plan

The Public and Agency Involvement chapter for the EIR/EIS will identify the Authority's and FRA's the public and agency involvement efforts conducted in the preparation of the Draft EIR/EIS.

9.10 Chapter 9—Public and Agency Involvement EIR/EIS Outline

The RC shall use the following outline for organizing Chapter 9 of the project EIR/EIS, using the heading hierarchy and format as indicated.

Chapter 9 Public and Agency Involvement
9.1 Environmental Justice Outreach
9.2 Public and Agency Scoping
  9.2.1 Notices of Preparation, Notices of Intent, and Public Information Materials
  9.2.2 Scoping Meetings
  9.2.3 Scoping Comments
9.3 Alternatives Analysis Process
  9.3.1 Public Information Meetings and Materials during the Alternatives Analysis Process
  9.3.1 Technical Working Group Meetings during the Alternatives Analysis Process
  9.3.2 Environmental Resource Agency Meetings during the Alternatives Analysis Process
9.4 Development of the Draft EIR/EIS
  9.4.1 Outreach, Involvement, and Communications Guidance
  9.4.2 Agreements and Memoranda of Understanding
  9.4.3 Public Information Materials and Meetings
  9.4.4 Tribal Coordination Meetings
  9.4.5 Technical Working Group Meetings
  9.4.6 Agency Meetings and Consultation
9.5 Notification and Circulation of the Draft EIR/EIS
9.6 Publication and Review of the Draft EIR/EIS [section for Final EIR/EIS only]
  9.6.1 Public Information Meetings and Hearings
  9.6.2 Comments on the Draft EIR/EIS
  9.6.3 Response to Common Comments

10 EIR/EIS DISTRIBUTION

The following methodology provides the framework for the distribution of the environmental impact report/environmental impact statement (EIR/EIS). The Regional Consultant must coordinate with the California High-Speed Rail Authority (Authority) and the Program Management Team for section-specific direction and approval of a final distribution action plan.

List the agencies and parties that were informed of the availability of the EIR/EIS, in addition to the repository locations where the EIR/EISs were distributed. Include the following categories in this chapter and include specific contact information for each category. Present all listings in alphabetical order by agency or group name. Example listings are provided in the subsections of this chapter.

Follow Federal Railroad Administration and U.S. Environmental Protection Agency guidelines on NEPA distribution as well as pertinent CEQA guidance. All approved Final EIR/EISs must be distributed to all federal, state, and local agencies and private organizations and to members of the public who provided substantive comments on the Draft EIR/EIS or who requested a copy of the final document.

Note that Draft and Supplemental EIR/EIS documents must go through the State Clearinghouse while Final EIS/EIS documents do not.

Ensure EIR/EIS distribution is completed no later than the time the document is filed with EPA for publication of the Notice of Availability in the *Federal Register*.

- **Repository Locations**—City/town: facility name, address, phone number
- **Federal Agencies**—Agency name, professional title of contact person, city, state
- **State Agencies**—Agency name, professional title of contact person, city, state
- **Elected Officials**—Federal elected officials (U.S. senators and representatives); state elected officials (governor, state senate, state assembly); regional county boards of supervisors (by county followed by names of board supervisors); mayors (name and city represented); city council members (by city followed by names of city council members); agricultural commissioners (name and elected title), if applicable
- **Regional/Local Agencies**—Agency name, city, state
- **Organizations and Businesses**—Organization or business name, city, state
- **Native American Contacts**—Tribal organization name, name of contact person, title
- **Schools**[1] **and Districts**—School district or school name, name of contact person, title

The text below is an example of the introductory paragraph in Chapter 8.0, EIR/EIS Distribution, of the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014).

The distribution of the *[section name] Section [Draft/Final] Environmental Impact Report/ Environmental Impact Statement* (EIR/EIS) emphasizes the use of electronic media to ensure cost-effective, broad availability to the public and interested parties. The entire EIR/EIS, appendices, and supporting reports are available on the California High-Speed Rail Authority's web site (www.hsr.ca.gov). The EIR/EIS is also available at the repositories listed below. Electronic copies of the document and technical studies are available on compact disc upon

[1] Per PRC 21151.4, if the project would result in hazardous air emissions or handling of extremely hazardous substances or mixtures, the associated school district for schools within 0.25 mile of the project shall be consulted and given written notification.

request at the office of the California High-Speed Rail Authority, 700 L Street, Suite 800, Sacramento, CA 95814.

All persons, agencies, and organizations listed in this chapter have been informed of the availability of, and locations to obtain, the EIR/EIS as well as the timing of the 60-day formal comment period. Notice of availability of the EIR/EIS has been included in the *Federal Register*. Repositories and cooperating federal agencies were sent both hard and electronic copies of the EIR/EIS. Copies were filed with the California State Clearinghouse. Each county within [section name] Section received a copy of the EIR/EIS. Other federal agencies, state agencies, and selected interested parties listed below have received summary chapters and electronic copies of the EIR/EIS. Summary chapters have been translated into the primary languages of the [section name] area, including [list all languages]. Federal, state, and county elected officials, mayors of cities with possible stations, and the potentially affected local agencies listed below were mailed an informational brochure and instructions on how to obtain a copy of the EIR/EIS. Additional local elected officials and agency representatives and all others on the project mailing list have been mailed a notification that includes information about how to access the EIR/EIS; the timing of the formal comment period; and public hearing dates, times, and locations.

For publication of the Final EIR/EIS, example text below identifies information regarding comments and commenters of the Draft EIR/EIS.

All Draft EIR/EIS commenters, at a minimum, received notification of the availability of the Final EIR/EIS (see Volume IV, Comments and Responses to Draft EIR/EIS, for the list of all commenters).

10.1 Repository Locations

List facility name, address, and phone number. The following is an example from the *Fresno to Bakersfield Section Final EIR/EIS:*

> *Allensworth: Allensworth Community Services District, 3336 Road 84, Allensworth, CA*
> *Phone: (661) 849-3894*
>
> *Allensworth: Allensworth Community Center, 8123 Avenue 36, Allensworth, CA*
> *Contact: Kayode Kadara*

Make sure that identified repositories are in centrally located facilities, which are typically public libraries. Consider Environmental Justice areas of concern when selecting repository locations.

Locate a public review space at the Authority headquarters and regional office for the HSR section. Provide at the review space (at minimum) printed copies of the EIR/EIS Volumes, the CD or DVD disc with the technical studies, reference materials (in print or electronic format) used in developing the EIR/EIS and associated documents, and a computer or other equipment to view materials on the CD, DVD, or other electronic formats.

10.2 Federal Agencies

List agency name, professional title of contact person, city, and state. The text below is example text from the *Fresno to Bakersfield Section Final EIR/EIS* and may be used as boilerplate text.

> *Advisory Council on Historic Preservation, Executive Director, Washington, DC*
>
> *Bureau of Indian Affairs, Regional Director, Sacramento, CA*

10.3 State Agencies

List agency name, professional title of contact person, city, and state. The text below is example text from the *Fresno to Bakersfield Section Final EIR/EIS* and may be used as boilerplate text.

California Air Resources Board, Chairman, Sacramento, CA

California Business, Transportation and Housing Agency, Agency Secretary, Sacramento, CA

10.4 Elected Officials

List elected officials by government level, by legislative body, and by name of the elected official. The text below is example text from the *Fresno to Bakersfield Section Final EIR/EIS* and may be used as boilerplate text.

Other local elected officials not listed below have been notified regarding the availability of the [section name] Section Draft EIR/EIS.

10.4.1 Federal Elected Officials

10.4.1.1 U.S. Senators

List name (preceded by "The Honorable"), U.S. Senate, California. The text below is example text from the *Fresno to Bakersfield Section Final EIR/EIS* and may be adapted for use in other HSR sections.

The Honorable Barbara Boxer, U.S. Senate, California

The Honorable Dianne Feinstein, U.S. Senate, California

10.4.1.2 U.S. House of Representatives

List name (preceded by "The Honorable"), Speaker of the House, or list name (preceded by "The Honorable"), [Name of Congressional District]. The text below is example text from the *Fresno to Bakersfield Section Final EIR/EIS* and may be adapted for use in other HSR sections.

The Honorable John Boehner, Speaker of the House

The Honorable Dennis Cardoza, 18th Congressional District

10.4.2 State Elected Officials

10.4.2.1 Governor

List name (preceded by "The Honorable"), Governor of California. The text below is example text from the *Fresno to Bakersfield Section Final EIR/EIS* and may be adapted for use in other HSR sections.

The Honorable Edmund G. Brown Jr., Governor of California

10.4.2.2 State Senate

List name (preceded by "The Honorable"), President pro Tem. The text below is example text from the *Fresno to Bakersfield Section Final EIR/EIS* and may be adapted for use in other HSR sections.

The Honorable Darrell Steinberg, Senate President pro Tem

10.4.2.3 State Assembly

List name (preceded by "The Honorable"), California Assembly Speaker. The text below is example text from the *Fresno to Bakersfield Section Final EIR/EIS* and may be adapted for use in other HSR sections.

The Honorable John Perez, California Assembly Speaker

10.4.3 Regional County Board of Supervisors

10.4.3.1 [county]

List name (preceded by "The Honorable"), followed by board position. The following is an example from the *Fresno to Bakersfield Section Final EIR/EIS:*

The Honorable Debbie Poochigian, Chairman

The Honorable Henry Perea, Vice Chairman

The Honorable Phil Larson

The Honorable Susan Anderson

The Honorable Judy Case

10.4.4 Mayors

List name (preceded by "The Honorable"), followed by city the mayor is representing. The following is an example from the *Fresno to Bakersfield Section Final EIR/EIS:*

The Honorable Mayor Ashley Swearengin, Fresno

10.4.5 City Council Members

10.4.5.1 [city]

List name (preceded by "The Honorable"). The following is an example from the *Fresno to Bakersfield Section Final EIR/EIS:*

The Honorable Oliver Baines III

The Honorable Andreas Borgeas

10.4.6 Agricultural Commissioners

List name, followed by commission position. The following is an example from the *Fresno to Bakersfield Section Final EIR/EIS:*

Ms. Carol N. Hafner, Fresno County Agricultural Commissioner

Mr. David A. Robinson, Merced County Agricultural Commissioner

10.5 Regional/Local Agencies

List agency name, city, and state. The following is an example from the *Fresno to Bakersfield Section Final EIR/EIS:*

Central Valley Flood Protection Board, Fresno, CA

10.6 Organizations and Businesses

List organization or business name, city, and state. The following is an example from the *Fresno to Bakersfield Section Final EIR/EIS:*

Amtrak, Mayors Advisory Council, Bakersfield, CA

Amtrak, Vice President Governmental Affairs, Washington DC

10.7 Native American Contacts

List name of tribal organization, name of contact person, and title. The following is an example from the *Fresno to Bakersfield Section Final EIR/EIS:*

Cold Springs Rancheria of Mono Indians, Mr. Travis Coleman, Chairperson

Santa Rosa Rancheria, Mr. Clarence Atwell, Chairperson

10.8 Schools and Districts

List organization name, name of contact person, and title. The following is an example from the *Fresno to Bakersfield Section Final EIR/EIS:*

Fresno County Office of Education, Mr. Larry Powell, Superintendent

Pacific Union Elementary School District, Mr. Warren Jennings, Superintendent

10.9 Products

The RC is responsible for preparing the following products, under Authority and FRA direction, according to PMT guidance and subject to PMT quality control and assurance.

10.9.1 Project EIR/EIS Volume 1

1. EIR/EIS Distribution Chapter 10 for the EIR/EIS
2. Distribution Action Plan

The EIR/EIS Distribution chapter for the EIR/EIS will identify the Authority's and FRA's efforts to distribute the EIR/EIS documents and make those documents accessible to the public, agencies, and other stakeholders.

10.10 Chapter 10—EIR/EIS Distribution EIR/EIS Outline

The RC shall use the following outline for organizing Chapter 10 of the project EIR/EIS, using the heading hierarchy and format as indicated.

Chapter 10 EIR/EIS Distribution
10.1 Repository Locations
10.2 Federal Agencies
10.3 State Agencies
10.4 Elected Officials
- 10.4.1 Federal Elected Officials
  - 10.4.1.1 U.S. Senators
  - 10.4.1.2 U.S. House of Representatives
- 10.4.2 State Elected Officials
  - 10.4.2.1 Governor
  - 10.4.2.2 State Senate
  - 10.4.2.3 State Assembly

10.4.3 Regional County Board of Supervisors
10.4.3.1 [county]
10.4.4 Mayors
10.4.5 City Council Members
10.4.5.1 [city]
10.4.6 Agricultural Commissioners
10.5 Regional/Local Agencies
10.6 Organizations and Businesses
10.7 Native American Contacts
10.8 Schools and Districts
9.6.1 Public Information Meetings and Hearings
9.6.2 Comments on the Draft EIR/EIS
9.6.3 Response to Common Comments

11 LIST OF PREPARERS

This chapter of the California High-Speed-Rail (HSR) project environmental impact report/environmental impact statement (EIR/EIS) summarizes all the personnel primarily responsible for the preparation and review of the project-level environmental documents. The Regional Consultant (RC) shall compile and document preparer information, and prepare this chapter of the EIR/EIS, including:

- Role in the preparation of the analysis/report
- Names of all preparers, including personnel who conducted field work, performed analyses, documented results, provided quality control, or were otherwise substantially involved
- Titles and any relevant credentials or registrations (by initials, e.g., P.E., A.I.C.P., R.P.A., A.I.A., A.S.L.A.) for all preparers
- Years of experience and a short explanation of that experience
- Education for all preparers, including degree and school (define any acronyms that are not the standard—B.A., M.A., B.S., M.S., or Ph.D.) (do not include course work or certificate programs that are not directly related to the work conducted)

An example of the format for the list of preparers follows.

Table 11-1 California High-Speed Rail Authority (example only)

Project Role	Name, Credential	Qualifications
Director of Environmental Services	Name, Credential	# years of experience. Degree, Major/coursework, School
Senior Environmental Planner, Biology /Natural Science	Name, Credential	# years of experience. Degree, Major/coursework, School
Senior Environmental Planner, Cultural Resources	Name, Credential	# years of experience. Degree, Major/coursework, School
Senior Environmental Planner, Social Science	Name, Credential	# years of experience. Degree, Major/coursework, School

Table 11-2 Federal Railroad Administration (example only)

Project Role	Name, Credential	Qualifications
Division Chief	Name, Credential	# years of experience. Degree, Major/coursework, School
Environmental Protection Specialist	Name, Credential	# years of experience. Degree, Major/coursework, School
Southwest Regional Manager	Name, Credential	# years of experience. Degree, Major/coursework, School

Table 11-3 Consultants (example only)

Project Role	Name, Credential	Qualifications
Program Managers		
Air Quality	Name, Credential	# years of experience. Degree, Major/coursework, School
Construction Scenarios	Name, Credential	# years of experience. Degree, Major/coursework, School
Deputy Program Director	Name, Credential	# years of experience. Degree, Major/coursework, School
Deputy Program Director, Engineering	Name, Credential	# years of experience. Degree, Major/coursework, School
Document Review, Quality Control/Quality Assurance	Name, Credential	# years of experience. Degree, Major/coursework, School
Environmental Corridor Manager	Name, Credential	# years of experience. Degree, Major/coursework, School
Environmental Manager	Name, Credential	# years of experience. Degree, Major/coursework, School
Environmental Planner	Name, Credential	# years of experience. Degree, Major/coursework, School
Environmental Specialist	Name, Credential	# years of experience. Degree, Major/coursework, School
Noise and Vibration	Name, Credential	# years of experience. Degree, Major/coursework, School
Planning Manager	Name, Credential	# years of experience. Degree, Major/coursework, School
Railroad Operations and Maintenance	Name, Credential	# years of experience. Degree, Major/coursework, School
Regional Manager	Name, Credential	# years of experience. Degree, Major/coursework, School
Supervising Architect	Name, Credential	# years of experience. Degree, Major/coursework, School
Technical Director	Name, Credential	# years of experience. Degree, Major/coursework, School
Travel Modeling Documentation	Name, Credential	# years of experience. Degree, Major/coursework, School
[Insert additional Program Management Team staff that assisted the RC environmental team in the development of the project-level environmental document]	[Insert Name, Registration]	[Insert # years of experience, Degree, Major/coursework, School]

Table 11-3 Consultants (example only) (continued)

Project Role	Name, Credential	Qualifications
Regional Consultant Environmental Team		
Environmental Manager and EIR/EIS Coordinator	Name, Credential	# years of experience. Degree, Major/coursework, School
Assistant Environmental Manager	Name, Credential	# years of experience. Degree, Major/coursework, School
[Insert professional title for the RC environmental team members that assisted in the preparation of the project-level environmental document. These may include those who authored or led document chapters, GIS, technical editing, word processing, etc.]	[Insert Name, Credential]	[Insert # years of experience, Degree, Major/coursework, School]

12 REFERENCES/SOURCES USED IN DOCUMENT PREPARATION

This chapter of the California High-Speed-Rail (HSR) project environmental impact report/environmental impact statement (EIR/EIS) contains a list of all the references and sources relied upon to prepare the project-level environmental document. The Regional Consultant (RC) shall compile and acknowledge the references and sources whether or not cited in text. Organize references and sources according to each chapter in the EIR/EIS and list in alphabetical order by the last name of the reference author or contact person, organization name, and website. For large reference items, specify a page range of material relied upon or utilized in EIR/EIS preparation. The Authority's *Style and Branding Guide* provides detailed direction on requirements for all references and citations, including terminology, grammar, punctuation, style, fonts and page layout. The RC shall compile and prepare this chapter of the EIR/EIS.

It is not necessary to include federal or state legislation in this section since these are public records and can be easily found on the internet. At the first reference to a legislation or act in each chapter, include the code information in parentheses following the title. Following are examples of code formats:

- 40 C.F.R. Part 350 et seq. (Code of Federal Regulations)
- 42 U.S.C. § 6901 et seq. (United States Code)
- 64 Fed. Reg. 28545 (Federal Register)
- Public Law 101-615
- USEO 13007 (U.S. Presidential Executive Order)
- EO S-3-05 (California Executive Order)
- Cal. Code Regs., tit. 14, § 15000 et seq. (California Code of Regulations)
- Cal. Public Res. Code, § 4291 (California Public Resources Code)
- Cal. Health and Safety Code, § 25249.5 et seq. (California Health and Safety Code)
- Cal. Water Code, § 13000 et seq. (California Water Code)
- Cal. Fish and Game Code, § 1500 et seq. (California Fish and Game Code)
- AB 32 (California Assembly Bill)
- SB 375 (California Senate Bill)
- California Government Code 65082

List the applicable abbreviations in the References section for reader convenience. For example:

AB	California Assembly Bill
C.F.R.	Code of Federal Regulations
EO	California Executive Order
SB	California Senate Bill
U.S. DOT	U.S. Department of Transportation
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USEO	U.S. Presidential Executive Order
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service

The regional consultant is responsible for providing **every** reference and source for inclusion in the administrative record. Consult with the most current California Attorney General's Administrative Record Guidance for additional reference requirements.

The following are reference examples for various source types. Refer also to the most recent environmental documents produced by the California High Speed Rail Authority, e.g., *Fresno to*

Bakersfield Section Final EIR/EIS (April 2014), or more recent HSR project EIR/EIS, for reference examples.

(Note: When listing internet addresses, include "**Error! Hyperlink reference not valid.**" only if "www" is not a part of the link.)

Website

Airports Council International. 2010. *World Airport Traffic Report 2009*. www.airports.org/cda/aci_common/display/main/aci_content07_c.jsp?zn=aci&cp=1-5-54_666_2 (accessed July 2010).

Amtrak Government Affairs. 2008. *Amtrak Fact Sheet, Fiscal Year 2008, State of California*. Washington, DC: October 2008. www.amtrak.com/pdf/factsheets/CALIFORNIA08.pdf (accessed July 2010).

Website Mapping

Google Maps. 2010. Driving directions from Fresno, CA, to San Francisco, CA, and from Fresno, CA, to Los Angeles, CA. http://maps.google.com/maps?rls=com.microsoft:*&oe=UTF-8&startIndex=&startPage=1 (accessed September 10, 2010).

Bing Maps (Bing). 2010. Microsoft Corporation and its data suppliers. www.bing.com/maps (accessed November 2011).

Abbreviation or Acronym

Authority. See California High-Speed Rail Authority.

Agency or Organization

California Department of Agriculture. 2010. *California Agricultural Production Statistics 2009–2010.* Sacramento.

California Department of Transportation (CALTRANS). 2008a. *San Joaquin Corridor Strategic Plan.* Sacramento.

———. 2008b. *California State Rail Plan, 2007–08 to 2017–18*. Sacramento: March 2008.

———. 2009a. Route 99 Corridor Business Plan. September 2009.

Parsons Brinckerhoff. 2010. Estimates based on Cambridge Systematics, Inc., 2007 projections.

Single Author

Cowan, Tadlock. 2005. *California's San Joaquin Valley: A Region in Transition.* Washington, DC: Congressional Research Service Report for Congress, Order Code RL33184, December 12, 2005.

Multiple Authors Reference

Bremner-Harrison, S., B.L. Cypher, C.M. Fiehler, A.P. Clevenger, and D. Hacker. 2007. *Use of Highway Crossing Structures by Kit Foxes.* Report prepared for the California Department of Transportation. August 2007.

Presentation

SH&E. 2009. "Alternative Strategies for Accommodating Future Aviation Demand." Presentation to the Regional Airport Planning Committee. New York, NY. November 20, 2009.

Email

Willis, Jessica. 2010. Air Quality Specialist, San Joaquin Valley Air Pollution Control District. Email communication with Cheri Velzy, Senior Air Quality Scientist, URS Corporation, August 4, 2010.

Multiple Authority Documents

California High-Speed Rail Authority (Authority). 2010a. *EMC Program Plan*. Prepared by Turner Engineering Corporation, September 2010.

———. 2010b. *Draft Environmental Impact Report/Environmental Impact Statement Assessment of California High Speed Train Alignment Electromagnetic Field Footprint.* Prepared by Turner Engineering, July 8, 2010.

———. 2011. *Automatic Train Control and Radio Systems: Requirements, Solutions and Radio Frequency Spectrum Challenges Technical Memorandum TM 300.04*. Prepared by Parsons Brinckerhoff, May 4, 2011.

Letters

Scott, Mark. 2011. City Manager, City of Fresno, Fresno, CA. Personal communication via letter regarding comments on the *Merced to Fresno Section High-Speed Train Draft EIR/EIS* with Roelof van Ark, California High-Speed Rail Authority, October 13, 2011.

Real Estate Search

Loopnet. 2010. "Commercial and Industrial Real Estate Database Search." www.loopnet.com (accessed July 3, 2010).

Zillow. 2010. "Home Real Estate Database Search." www.zillow.com/homes/ (accessed July 7, 2010).

GIS Files

City of Fresno. 1989. *Central Area Community Plan*. Fresno, CA: Housing and Community Development Department Redevelopment Division. July 1989. www.fresno.gov/NR/rdonlyres/846736A2-DE15-4BB6-8AB3-97625D1203DF/0/CentralAreaCommunityPlan.pdf.

———. 2009a. *Existing Land Use* (GIS shapefile: elu.shp). www.fresno.gov/Government/DepartmentDirectory/InformationServices/GIS/Layers.htm (accessed May 27, 2011).

———. 2009b. *Zoning* (GIS shapefile: zoning.shp). http://gis4u.fresno.gov/downloads/zoning.zip (accessed May 27, 2011).

Memorandum

AECOM/CH2M Hill 2011. *CAHSR Merced-Fresno: Economic Modeling Assumptions.* Memorandum to project management team, March 28, 2011.

Reference for industry/agency publications and design standards (These would be utilized in the presentation of the project-level environmental document as a whole)

American Railway Engineering and Maintenance-of-Way Association (AREMA). 2012. *Manual for Railway Engineering.*

American Association of State Highway and Transportation Officials (AASHTO). 2007. *Highway Drainage Guidelines*.

SAMPLE FORMAT FOR CHAPTER 12.0 REFERENCES

S.0 Executive Summary

California High-Speed Rail Authority (Authority) and Federal Railroad Administration (FRA). 2005. *Final Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the proposed California High-Speed Train System.* August 2005.

Chapter 1 Project Purpose, Need, and Objectives

Airports Council International. 2010. *World Airport Traffic Report 2009*. www.airports.org/cda/aci_common/display/main/aci_content07_c.jsp?zn=aci&cp=1-5-54_666_2 (accessed July 2010).

Amtrak Government Affairs. 2008. *Amtrak Fact Sheet, Fiscal Year 2008, State of California*. Washington, DC: October 2008. www.amtrak.com/pdf/factsheets/CALIFORNIA08.pdf (accessed July 2010).

California High-Speed Rail Authority (Authority) and Federal Railroad Administration (FRA). 2005. *Final Program Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the proposed California High-Speed Train System.* August 2005.

Chapter 2 Alternatives

Amtrak. 2008. *Amtrak Annual Report, October 2007-September 2008*. www.amtrak.com/servlet/ContentServer/Page/1241245669222/1237608345018.

———. 2009. *Amtrak Monthly Performance Report for January 2009*. www.amtrak.com/servlet/ContentServer/Page/1241245669222/1237608345018.

Bremner-Harrison, S., B.L. Cypher, C.M. Fiehler, A.P. Clevenger, and D. Hacker. 2007. *Use of Highway Crossing Structures by Kit Foxes.* Report prepared for the California Department of Transportation. August 2007.

13 GLOSSARY OF TERMS

The Glossary of Terms provided below identifies and defines common terms or phrases used in California High-Speed-Rail (HSR) project environmental impact report/environmental impact statement (EIR/EIS) documents. The Regional Consultant shall review and modify the list as needed to include all terms pertinent to the specific HSR section or to remove terms not used in the specific HSR section. The RC shall compile and prepare this chapter of the EIR/EIS.

A

A Horizon: The A horizon is the soil zone immediately below the surface from which soluble material and fine-grained particles have been moved downward by water seeping into soil. Varying amounts of organic matter give the A horizon a dark color.

Abatement: Reduction; often used to describe noise mitigation.

Accessibility: The ease with which a site or facility may be reached by passengers and others necessary to the facility's intended function. Also, the extent to which a facility is usable by persons with disabilities, including wheelchair users.

Action Alternative: An alternative that proposes some action by one or both of the co-lead agencies, in contrast to the No Project Alternative.

Active Fault: A ground rupture that has occurred within approximately the last 11,000 years. A potentially active fault includes ruptures that occurred between 11,000 and 1.6 million years ago.

Actual Use: The amount of use that actually occurs.

Adverse: Negative or detrimental.

Affected Environment: The physical, biological, social, and economic setting potentially affected by one or more of the alternatives under consideration.

Air Pollution: A general term that refers to one or more chemical substances that degrade the quality of the atmosphere.

Alignment: The horizontal and vertical route of a transportation corridor or path.

Alluvium: A term applied to sediments deposited in a streambed, on a floodplain, a delta, or at the base of a mountain during comparatively recent geologic time.

Alquist-Priolo Earthquake Fault Zoning Act: A California law passed in 1972 to prevent construction of buildings used for human occupancy on surface traces of active faults.

Americans with Disabilities Act (ADA): Federal regulation establishing legal requirements for accessibility for those with disabilities.

Amplitude: The magnitude of a periodic wave; also describes the strength or intensity of a signal that travels in wave form, such as a radio signal.

Anthropogenic Fugitive Dust Emission: All mechanically suspended dust from human activity, including agriculture, construction, mining, and demolition; vehicular movement on paved and unpaved surfaces; materials handling, processing, and transport; cooling towers; and animal movement on surfaces that have been disturbed or altered by humans beyond a natural range.

Approximate Location: As defined in Government Code, Section 4216, as the "approximate location of subsurface installations" being a strip of land not greater than 24 inches wide on both sides of the exterior surface of the subsurface installation. Approximate location does not define depth.

Aquifer: Subsurface geologic unit (rock or sediment) that contains and transmits groundwater.

Arc, Arcing: When an electrical discharge crosses the space between two contacts.

Area of Potential Effect (APE): The area along the project right-of-way potentially affected by the construction and operation of the Project; for archaeological properties, considered to be the area of ground proposed to be disturbed during construction of the undertaking, including grading, cut-and-fill, easements, staging areas, utility relocation, borrow pits, and biological mitigation areas; for historic architecture, considered to be the proposed construction footprint and properties near the undertaking where the undertaking would result in a substantial change from the historic use, access, or noise and vibration levels that were present 50 years ago, or during the period of significance of a property, if different; paleontological resources, considered to be a zone 250 feet on both sides of the right-of-way for a given alternative, and within 0.5 mile of any potential facilities, including potential stations.

Artifacts: Objects made by people, including tools such as projectile points, scrapers, and grinding implements, waste products from making flaked stone tools (debitage), and non-utilitarian artifacts (beads, ornaments, ceremonial items, and rock art).

At-Grade: At ground surface level; used to describe roadways, river crossings, and track alignments.

Attainment: An air basin is considered to be in *attainment* for a particular pollutant if it meets the federal or state standards set for that pollutant. *See also* **Maintenance, Nonattainment.**

Authority: *See* **California High-Speed Rail Authority**.

A-Weighted Sound Level: A measure of sound intensity that is weighted to approximate the response of the human ear so it describes the way sound will affect people in the vicinity of a noise source.

B

Ballasted Track: Railways installed over a specific type of crushed rock that is graded to support heavily loaded rolling stock.

Barrier: A device intended to contain or redirect an errant vehicle by providing a physical limitation through which a vehicle would not typically pass.

Barrier Offset Distance: The lateral distance from the centerline of the track to the face of the barrier, trackside, or other roadside feature.

Baseline: Foundation or basis to use for comparison purposes.

Bas-Relief: Sculptural element characterized by varied surface planes in low relief.

Beneficial Visual Impact: Impact resulting if a project alternative eliminates a dominant feature that currently detracts from scenic qualities or blocks landscape vistas.

Best Management Practices (BMP): Methods designed to minimize adverse effects to the environment. Examples of BMPs include practices for erosion and sedimentation controls, watering for dust control, perimeter silt fences, rice straw bales, and sediment basins.

Biface: A type of prehistoric stone tool that is flaked on both faces or sides.

Biological Resources: Plant and wildlife species, terrestrial and aquatic habitats (including jurisdictional waters), and habitats of concern (including sensitive plant communities, critical habitat, core recovery areas, mitigation banks, and wildlife corridors).

Bogie: The vital area where wheels meet rails and is widely considered the most crucial component of a train.

B.P.: Years before the present, typically considered to be 1950.

British Thermal Unit: *See* **Btu**.

Btu: British thermal unit, equal to the amount of heat required to raise 1 pound of water 1 degree Fahrenheit at 1 atmosphere of pressure.

Buttressing: An action or structure that provides support or stability.

C

California Endangered Species Act (CESA): A law that mandates that state agencies do not approve a project that would jeopardize the continued existence of endangered species if reasonable and prudent alternatives are available that would avoid a jeopardy finding.

California Environmental Quality Act (CEQA): Legislation enacted in 1970 to protect the quality of the environment for the people of California by requiring public agencies and decision-makers to document and consider the environmental consequences of their actions. CEQA is the state equivalent of the National Environmental Policy Act (NEPA).

California High-Speed Rail Authority (Authority): The state governing board that has responsibility for planning, designing, constructing, and operating the California High Speed Rail (HSR) System. The Authority's mandate is to develop the HSR system in coordination with the state's existing transportation network, which includes intercity rail and bus lines, regional commuter rail lines, urban rail and bus transit lines, highways, and airports.

California High-Speed Rail (HSR): *See* **High-Speed Rail**.

California High-Speed Rail (HSR) System: *See* **High-Speed Rail System**.

Capital Cost: The total cost of acquiring an asset or constructing a project.

Capitol Corridor: An existing intercity rail alignment approximating the I-80 corridor; carries freight traffic, long-distance Amtrak service, and intrastate "Capitol" service.

Carbon Dioxide (CO_2): A colorless, odorless gas that occurs naturally in the atmosphere; fossil fuel combustion emits significant quantities of CO_2.

Carbon Monoxide (CO): A colorless, odorless gas generated in the urban environment primarily by the incomplete combustion of fossil fuels in motor vehicles.

Cathodic Protection: Method for controlling the corrosion and deterioration of metallic structures in contact with most forms of electrolytically conducting environments (i.e., environments containing enough ions to conduct electricity such as soils, seawater, and basically all natural waters). Cathodic protection reduces the corrosion rate of buried steel and concrete.

Central Control Facility: A facility for monitoring and controlling HSR operations. Co-located with the heavy maintenance facility, it provides central supervision over train and power dispatch facilities, serves as the hub for safety and security functions, manages real-time tracking of HSR vehicles, collects and records data, and controls access.

Centroid of Flow of Streams: The midpoint of that portion of a stream width that contains 50 percent of the total flow.

CCS 83: California Coordinate System of 1983—The system of plane coordinates established by the National Geodetic Survey for defining or stating the positions or locations of points on the surface of the earth within the State of California. CCS 83 is based on the North American Datum of 1983.

CEQA: *See* **California Environmental Quality Act**.

Check Rail: The guiding rail between the two running rails that maintains a derailed wheel in the track alignment. Check rails are installed 36 cm from the rail and can be placed inside one or both of the running rails.

Chert: A form of quartz used for the manufacture of stone tools.

Class I Trail: A trail within a separate right-of-way designated for exclusive use by bicycles and pedestrians. Cross traffic by motorists is minimized.

Class II Trail: A trail within a restricted right-of-way designated for semi-exclusive use by bicycles, with traffic by motor vehicles or pedestrians at crossings.

Class III Trail: A trail within a right-of-way designated by signs or permanent markings that is shared with pedestrians and motorists.

Clean Air Act (CAA): The law that defines the U.S. Environmental Protection Agency's responsibilities for protecting and improving the nation's air quality and the stratospheric ozone layer. The CAA protects the general public from exposure to airborne contaminants that are known to be hazardous to human health.

Clean Water Act (CWA): The primary federal law protecting the quality of the nation's surface waters, including wetlands. The CWA regulates discharges and spills of pollutants, including hazardous materials, to surface waters and groundwater.

CNEL: *See* **Community Noise Equivalent Level**.

CO_2e: Carbon dioxide equivalent, which is the concentration of CO_2 that would have global warming effects similar to other greenhouse gases

Cofferdam: Watertight enclosure from which water is pumped to expose the bottom of a body of water and allow construction.

Community Cohesion: The degree to which residents have a sense of belonging to their neighborhood, a level of commitment to the community, or an association with neighbors, groups, and institutions, usually as a result of continued association over time.

Community Noise Equivalent Level (CNEL): A 24-hour L_{eq} that has been adjusted to add a "penalty" of 5 dBA for evening noise (between 7:00 p.m. and 10:00 p.m.) and 10 dBA for nighttime noise (between 10:00 p.m. and 7:00 a.m.).

Concourse: Area for accommodating patrons at a high-speed rail station.

Concrete Derailment Walls: Tall curbs located close to the train wheels that, in the event of a derailment, keep the train within the right-of-way and upright.

Congestion Management Plan: A planning document that addresses strategies for reducing traffic congestion.

Connectivity: The degree of "connectedness" of a transportation system, such as a transit network, and the ease with which passengers can move from one point to another within the network or points outside the network.

Conservation Easement: An easement that transfers property development rights to another entity, such as the local jurisdiction or an agricultural protection organization; the land remains in private ownership and may be farmed, but may not be developed with urban uses. *See also* **Easement.**

Construction: Any activity that directly alters the environment, excluding surveying or mapping.

Construction Laydown Area: An area, typically adjacent to the HSR right-of-way and within a temporary construction easement, that is used to stockpile materials and store equipment for building HSR or related improvements. In some cases, this area is also used to assemble or pre-fabricate components of guideway or wayside facilities before transport to installation locations. Construction laydown areas are part of the Project Footprint that is evaluated for potential environmental impacts, yet actual use of the area is left to the discretion of the design-build contractor. After conclusion of construction, this area is typically restored to pre-construction condition.

Contact Wire: A suspended (overhead) wire system that supplies power from a central power source to an electric vehicle such as a train.

Containment Curb: A low concrete wall along the track that is designed to guide the train wheels back onto its rail if they leave the line.

Containment Parapet: A physical component of elevated guideways that, in the event of a derailment, keeps the train within the HSR right-of-way.

Contra-flow: Movement against the general direction of flow.

Cooperating Agency: Any agency invited by the lead federal agency that has agreed to participate in the NEPA process, and has legal jurisdiction over, or technical expertise regarding, environmental impacts associated with a proposed action.

Corridor: A geographic belt or band that follows the general route of a transportation facility (e.g., highway or railroad).

Cowardin Classification System: A comprehensive classification system of wetlands and deepwater habitats developed for the U.S. Fish and Wildlife Service in 1979. Under this system, wetlands are of two basic types: coastal (also known as tidal or estuarine wetlands) and inland (also known as non-tidal, freshwater, or palustrine wetlands).

Criteria Pollutants: Pollutants for which federal and state air quality standards have been established: carbon monoxide (CO), sulfur oxides (SO_x), nitrogen oxides (NO_x), ozone (O_3), particulate matter with a diameter of 10 microns or less (PM_{10}), particulate matter with a diameter of 2.5 microns or less ($PM_{2.5}$), and lead (Pb).

Critical Habitat: Designated areas that provide suitable habitat for federally listed threatened or endangered species, and in which are the geographical locations and physical features essential to the conservation of a particular species.

Cultural Resources: Resources related to the tangible and intangible aspects of cultural systems, living and dead, that are valued by a given culture or contain information about the culture. Cultural resources include, but are not limited to, sites, structures, buildings, districts, and objects associated with or representative of people, cultures, and human activities and events.

Cumulative Impact: (1) CEQA — the result of two or more individual impacts that, when considered together, are considerable or that compound or increase other environmental impacts; (2) NEPA — an impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.

Cut and Fill: Construction technique involving excavation or grading followed by placement and compaction of fill material.

Cut Slope: A slope that is shaped by excavation or grading. *See also* **Fill Slope**.

D

Datum: A reference from which measurements are made for establishing horizontal and vertical control.

Debitage: Waste byproducts—chips or debris—resulting from the manufacture of stone tools; found in large quantities in a tool-making area.

Decibel (dB): A logarithmic measurement of noise intensity.

Dedicated Corridor: Segment along the HSR alignment where HSRs operate in a right-of-way that is exclusive of other passenger or freight railroads.

Dedicated Track: Segment along the HSR alignment where HSRs operate on tracks exclusive of other passenger and freight railroads.

Degree of Curve: The central angle turned by a curve in 100 feet. It is closely approximated by Dc = 5,730 feet/radius. Railroad curves are defined by the Chord Definition, in which the length is described by a 100-foot-long tangent between two points on the arc of the curve.

Depositional Environment: The conditions in which a sedimentary unit is deposited

Derailment Containment Systems: Systems that ensure the train wheels do not leave the tracks even in the event of major seismic movements.

Design Criteria. To determine each alternative's ability to meet the HSR project purpose and need, alternatives are evaluated using HSR system performance criteria that capture design differences and qualities in the alignment and station locations.

Detention Pond: A pond designed to temporarily store and slowly release the runoff that it receives.

Dewatering: The process of removing water from an area or substance, such as fill material.

Digital Terrain Model: A three-dimensional model of digital surfaces of topographic features.

Disturbance: A discrete natural or human induced-induced event that causes a change in the condition of an ecological system.

Dry Utility: A wire, cable, pipeline, and support facility used to convey electricity, natural gas, gaseous chemicals, telecommunications, cable television, or other non-liquid products.

E

Easement: An interest in land owned by another individual or organization that entitles its holder to a specific limited use.

Ecosystem: An interconnected network of living organisms, including people, and their local physical environment; often viewed as an ecological unit.

Effect: A change in the condition or function of an environmental resource or environmental value as a result of human activity.

Electric Multiple Units (EMU): A multiple-unit train consisting of self-propelled carriages that use electricity as the motive power. An EMU requires no separate locomotive, as electric traction motors are incorporated within one or a number of the carriages. Most EMUs are used for passenger trains, but some have been built or converted for specialized non-passenger roles, such as carrying mail or luggage, or in departmental use, for example as de-icing trains. An EMU is usually formed of two or more semi-permanently coupled carriages, but electrically powered single-unit railcars are also generally classed as EMUs.

Electromagnetic Field (EMF): The force field that extends outward from any moving electrical current, consisting of both a magnetic field and an electric field.

Electromagnetic Interference (EMI): An electrical emission or disturbance that causes degradation in performance or results in malfunctions of electrical or electronic equipment, devices, or systems.

Electrostimulation: Nerve and muscle responses to the internal electric field in the body.

Elevated Guideways: Emergency walkways approximately 60 feet high on both sides of a track in certain urban areas.

Emergent: (1) Arising naturally; (2) Vegetation rooted in periodically or continuously inundated substrate but with a portion of the plant extending above the water.

EMF: *See* **Electromagnetic Field.**

EMI: *See* **Electromagnetic Interference.**

Eminent Domain: A jurisdiction or agency's legal right to take private property for public use in exchange for fair compensation.

Emission and Dispersion Modeling System (EDMS): Modeling system used by the Federal Aviation Administration to estimate airplane emissions generated from a specified number of landing and take-off cycles.

EMU: *See* **Electric Multiple Units.**

Endangered Species: Any species listed under the federal Endangered Species Act as being in danger of or threatened with extinction throughout all or most of its range.

Enplanement: The act of boarding an airplane.

Environmental Impact Report (EIR): Documentation of the detailed analysis of a project's potential significant effects, mitigation measures, and reasonable alternatives to avoid significant effects. The EIR is prepared as part of the CEQA environmental review process.

Environmental Impact Statement (EIS): Documentation required by the National Environmental Policy Act (NEPA) for certain actions "significantly affecting the quality of the human environment." An EIS is a decision-making tool that presents detailed analysis of a proposed action and alternatives to the proposed action. The EIS presents the project's potential effects—both beneficial and adverse- and any mitigation measures to reduce adverse effects.

Environmental Justice: Identifying and addressing the potential for disproportionately high and adverse effects of programs, policies, and activities on minority and low-income populations.

Erosion: Process by which earth materials are worn down by the action of flowing water, ice, or wind.

Ethnicity: A grouping or categorization of people based on shared cultural traits such as ancestral origin, language, custom, or social attitude.

F

Fare Gate: Physical barrier that requires a valid HSR ticket to pass.

Farmland Mapping and Monitoring Program (FMMP): An automated map and database system administered by the California Department of Conservation that records changes in agricultural land use.

Farmland of Local Importance: Farmlands important to the local agricultural community, as determined by each county's board of supervisors and local advisory committee. *See also* **Farmland of Statewide Importance** *and* **Prime Farmland.**

Farmland of Statewide Importance: Farmlands that are similar to prime farmlands but are less valuable because they have steeper slopes, less ability to retain moisture in the soil, or other characteristics that limit their use. To quality as Farmland of Statewide Importance, a property must have been used for production of irrigated crops at some time during the previous 4 years.

Farmland Severance: The acquisition of part of a farm property that results in the severance (disconnection) of part of the land from agricultural use.

Fault: A fracture in the earth's lithosphere (brittle rocky shell) where movement has occurred or is occurring.

Fault Creep: (1) The slow, continuous movement of crustal blocks along a fault; (2) measurable surface displacement along a fault in the absence of notable earthquakes.

Fault Rupture: A rupture in which the fault extends to the ground surface and causes the ground to break, resulting in an abrupt, relative ground displacement. Surface-fault ruptures are the result of stresses relieved during an earthquake, and they often damage structures astride the typically narrow rupture zone.

Feasible: Capable of being implemented.

Fecundity: Fertility; the potential to be fruitful in offspring or vegetation.

Federal Endangered Species Act (ESA): The Federal ESA and subsequent amendments (Sections 7, 9, and 10) provide guidance for conserving federally listed species and the ecosystems upon which they depend.

Federal Railroad Administration (FRA): An agency within the U.S. Department of Transportation that administers financial assistance programs and regulates the operation and safety of freight and passenger rail throughout the United States.

Feeder Route: Branch routes that feed into main (arterial) routes.

Fenestration: The arrangement, proportioning, and design of windows and doors in a building; openings in a building wall, such as windows and doors, designed to permit the passage of air, light, and people.

Fiber Optic Cable System: A data transmission technology that relies on light rather than electricity, conveying data through a cable consisting of a central glass core surrounded by layers of plastic.

Fill Slope: A slope shaped by the placement and compaction of loose fill material, which may be reused from elsewhere on the construction site or imported.

Fiscally or Financially Constrained Plans: Plans that are limited by the foreseen availability of project funding in a region.

Flyover: A bridge that carries one road or rail alignment aerially over another.

Footprint: The area covered by a facility or affected by construction activities.

Formation: A geologic unit (e.g., Modesto Formation and the Riverbank Formation).

Fossil Localities: Areas where fossils have been found.

Fossils: The remains or traces of ancient plants, animals, and other organisms.

Freeboard: Stream bank or levee height above the high-water mark of a defined high-flow event such as the 100-year flood.

Free Area: Area within the station that is open to the general public.

Frequency: The number of times a field, such as an electromagnetic field, changes direction in space each second. Also, the number of trains, flights, or other transportation service that occur in a given period.

Full Parcel Acquisition: A permanent taking of a parcel of land as part of land acquisition for a project.

G

G Force: A force with a magnitude equal to the gravitational force acting on a body at sea level; expressed as 1.0 g.

Gauss: The unit of measure describing the strength of a magnetic field. Near the earth surface, the magnetic field measures approximately 0.5 gauss (0.1 Tesla). *See also* **Tesla**.

General Conformity Rule: Federal, state, tribal, and local governments work in air quality nonattainment or maintenance areas to ensure that federal actions conform to the initiatives established in the applicable state implementation plan or tribal implementation plan.

General Plan: A planning document, usually at the city or county level, which encapsulates policies for land use and development over a specified period of time. A general plan may be supplemented by specific plans that address land use and development policies for specific portions of a planning jurisdiction, such as historic districts or areas slated for redevelopment.

Geographic Information System (GIS): An information management system designed to store and analyze data referenced by spatial or geographic coordinates.

Giga: Prefix meaning 1 billion.

GIS: *See* **Geographic Information System.**

Grade Crossing: The intersection of a railroad and a highway at the same elevation (grade); an intersection of two or more highways; an intersection of two railroads.

Grade, Gradient: Slope changes in elevation, defined in percentage, as feet of rise in 100 feet.

Grade-Separated: At different elevations; on separate levels.

Greenhouse Gases: A class of air pollutants believed to contribute to the greenhouse global warming effect, including nitrogen oxides (NO_x), hydrocarbons (HC), and carbon dioxide (CO_2).

Grid: A system of interconnected power generators and power transmission lines managed to meet the requirements of energy users connected to the grid at various points.

Groundwater: Water contained and transmitted through open spaces within rock and sediment below the ground surface.

Growth Inducement: Contribution to the rate or extent of development in an area.

Guard Rail: A short guidance rail in the guideway. When a wheel passes over a switch frog in a non-guided section, the opposite wheel is guided by the guard rail, which acts on the back of the wheel flange.

Guideway: A track or riding surface that supports and physically guides transit vehicles specially designed to travel exclusively on it (as defined by the Orange County Transportation Authority). Similarly, *Fixed Guideway* is a public transportation facility using and occupying a separate right-of-way or rail for the exclusive use of public transportation and other high-occupancy vehicles or a fixed catenary system useable by other forms of transportation (as defined by the Federal Railroad Administration).

Guideway System: For the purposes of this California High-Speed Rail project, the integrated linear system of infrastructure components (e.g., track structures; tunnel, trench, embankment, or bridge structures; overhead contact system; traction power substations; switching and paralleling stations; signaling and train control elements; perimeter access controls, guideway operations and maintenance access, linear right-of-way) that enables the high-speed train to travel along the high-speed rail alignment.

H

Habitat: An environment where plants or animals naturally occur; an ecological setting used by animals for a particular purpose (e.g., roosting habitat or breeding habitat).

Hazardous Materials: Any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety, or the environment, if released.

Hazardous Waste: A hazardous material that is no longer of use and will be disposed of. Hazardous waste is regulated by the U.S. Environmental Protection Agency under the Resource Conservation and Recovery Act. California hazardous waste law is in some cases more stringent than federal law, and waste can often be defined as California hazardous waste (or non-RCRA hazardous waste).

Headway: The time between buses, trains, or other transit vehicles at a given point. For example, a 15-minute headway means that one bus arrives every 15 minutes.

Heavy Maintenance Facility (HMF): A maintenance facility that supports delivery, testing, and commissioning on the first completed segment of the HSR System. Trainset assembly, testing and commissioning, train storage, inspection, maintenance, retrofitting, and overhaul are typical HMF activities.

Herbaceous: Plants that have little or no woody tissue. Herbaceous plants typically survive for only a single growing season.

Heritage Resources: An alternate term for cultural resources used in some planning documents. *See* **Cultural Resources.**

Hertz: A unit of measure that describes **frequency**; equal to cycles (number of reversals) per second.

High Risk Utility: Utility facilities conducting or carrying specific materials identified in Section 2 of the *Caltrans Project Development Procedures Manual,* Appendix LL—Utilities. Other utilities that could disrupt the operation of HSR.

High-Speed Steel-Wheel-On-Steel-Rail Train: An improvement of traditional railroad passenger technology that has been designed to operate at speeds of 100 to 150 mph on existing rail infrastructure.

High-Speed Train: A train designed to operate safely and reliably at speeds near 220 mph.

High-Speed Train System: The system that includes the HSR tracks, structures, stations, traction-powered substations, maintenance facilities, and train vehicles able to travel 220 mph.

High Visual Impacts: Impacts sustained if features of a project alternative are very obvious, such that they begin to dominate the landscape and detract from the existing landscape characteristics or scenic qualities.

HMF: *See* **Heavy Maintenance Facility.**

Holocene: The period following the Pleistocene, from 10,000 years before present to the present.

HSR Alternative Alignment: The general location of an HSR guideway within the study corridor; HSR alternative alignments are generally along or adjacent to existing transportation corridors.

HSR Alignment Segment: A portion of an alignment (often defined to distinguish sub-alternatives) that can be combined with other segments to form an alignment.

HSR Network Alternatives: Different ways to implement the HSR System in the study area with combinations of HSR alternative alignments and station locations.

Hydrocarbons: Various organic compounds, including methane, emitted principally from the storage, handling, and combustion of fossil fuels.

I

Impact: A change in the condition or function of an environmental resource or environmental value as a result of human activity.

Impervious Surface: Surface covered by impenetrable materials, such as parking lots and buildings, which increases the potential for water runoff and reduces the potential for groundwater recharge.

Important Farmland: Categorized as **Prime Farmland, Farmland of Statewide Importance, Unique Farmland,** or **Farmland of Local Importance** under the **Farmland Mapping and Monitoring Program.** The categories are defined according to U.S. Department of Agriculture land inventory and monitoring criteria, as modified for California.

Indigenous Species: A native species; any plant or animal species that occurs naturally in a wilderness area.

Infrastructure: The facilities required for a societal function or service (e.g., transportation and utility infrastructure).

Initial Study: An environmental study carried out in compliance with CEQA with the goal of evaluating whether a proposed project could have significant impacts on the environment.

Insertion Loss: The actual noise-level reduction at a specific receiver due to construction of a noise barrier or some other intervention between the noise source (e.g., traffic) and the receiver.

In-situ: In the original or natural position.

Intactness: A measure of the visual integrity of the natural and human-built landscape and its freedom from encroaching elements.

Intermediate Station: A train station between two other stations.

Intermittent Stream: A stream that only flows only during part of the year.

Intermodal: Transportation that involves more than one mode (e.g., walk, bike, auto, transit, taxi, train, bus, and air) during a single journey.

Intermodal Station: A transit station for more than one mode of transportation.

Interoperability: In the context of European high-speed lines, the aptitude of the railway network to allow high-speed trains to run safely and continuously with the specified performances.

Intrusion: An errant vehicle's exit out of its right-of-way and entry into the operating space of another transportation system's right-of-way.

Intrusion Detection Technology: Technology used in the fencing around HSR operations to protect a train from the derailment of an adjacent train. When an intrusion detection system is activated, HSR operations are stopped by the signaling system.

Inversion: A region where atmospheric temperature increases rather than decreases with height, suppressing atmospheric mixing and tending to trap pollutants near the ground surface where their effects on health and materials are greater.

Invertebrate: Organisms lacking a vertebral column.

Investment-Grade Ridership Forecast: Ridership forecast that is sufficiently detailed and reliable to permit responsible decision-making about capital expenditures.

K

Key viewpoints (KVP): Viewpoints that represent the range of visual character and visual quality in the project viewshed, which is the portion of the surrounding landscape within which a project is potentially visible.

Kilo: Prefix meaning 1 thousand.

Kilovolt: A unit of potential equal to a thousand volts.

Kiss-and-Ride: Facility for private vehicles to drop-off or pick-up HSR patrons.

L

Land Use Compatibility Assessment: An assessment of the compatibility of a proposed project or land use with existing and projected land uses in nearby areas based on the sensitivity of various land uses to change related to the alternatives, and the impact of these changes on the land use.

Landscape Unit: An area of distinct, but not necessarily homogenous, visual character.

Landslide: Movement of earth or rock materials down a slope under the influence of gravity.

Lead (Pb): A stable element that can have toxic effects and that persists and accumulates in the environment, humans, or animals.

Lead Agency: The public agency that has the principal responsibility for carrying out or approving a project or action and is responsible for preparing environmental review documents in compliance with CEQA and/or NEPA.

L_{eq}: A measure of the average noise level during a specified period of time.

Leq (h), dBA: Equivalent or average noise level for the noisiest hour, expressed in **A-weighted decibels.**

Less than Significant: In CEQA usage, describes an impact that is not sufficiently adverse, intense, or prolonged to require **mitigation.**

Levee: A berm or wall used to raise the height of a riverbank.

Level of Service (LOS): A rating using qualitative measures to characterize operational conditions within a traffic stream and their perception by motorists and passengers.

Linguistic Isolation: Defined by the U.S. Census Bureau as living in a household in which all members aged 14 years and older speak a non-English language and also speak English less than "very well" (i.e., have difficulty with English).

Liquefaction: A type of ground failure in which soils or sediments lose their internal cohesion, cease to behave as a solid, and flow like a liquid.

Lithic: Pertaining to or describing a stone tool or artifact.

Local Geology: Geologic units in the immediate vicinity of the area of potential effect.

Logarithmic Scale: A measurement in which the ratio of successive intervals is not equal to 1 (which is typical for linear scales) but is some common factor larger than the previous interval (a typical ratio is 10, so that the marks on the scale read: 1, 10, 100, 1000, 10000, etc.). Logarithmic scales are useful for graphing values that have a very large range.

Longitudinal: A facility located parallel to and within a highway or railway right-of-way.

LOSSAN: Los Angeles to San Diego rail corridor.

Low Risk Utility: All utilities that are not identified as high risk facilities (as defined in Section 2 of the *Caltrans Project Development Procedures Manual,* Appendix LL—Utilities).

Low Visual Impacts: Impacts sustained if features of a project alternative are consistent with the existing line, form, texture, and color of other elements in the landscape and do not stand out.

M

Magnetic Levitation (Maglev): A high-speed train technology that relies on attractive or repulsive magnetic forces to lift and propel a train along a guideway.

Maintenance: An air basin that was formerly in nonattainment but now meets the established standards for that pollutant. *See also* **Attainment** and **Nonattainment**.

Maintenance of Way: A repair and maintenance activity for a railway right-of-way and track, including tracks, roadways, buildings, signals, and communication and power facilities.

Maintenance-of-Way Facility: A facility co-located with the heavy-maintenance facility with offices for inspection and maintenance staff and storage areas for essential equipment and materials, such as rail ballast, ties, sections of rail, OCS poles, and diesel-powered maintenance trains.

Maintenance-of-Way Program: A program of preventative and corrective maintenance, schedules for inspection and maintenance activities, and safety regulations for HSR employees.

Maintenance Siding: A dead-end track dedicated to park maintenance trains and connected to a passing track, never to the main line.

Major Investment Study (MIS): A study that evaluates project alternatives for their ability to solve an area's transportation problems.

Master Plan: A comprehensive planning document intended to guide the long-range growth and development of a community or region, or the long-term management and use of a parkland.

Mean High-Water Mark: The elevation reached by the water surface at the mean (average) high water level (average high tide elevation or average flood elevation), often indicated by physical characteristics such as erosion, lines of vegetation, or changes in type of vegetation.

Measure M: A measure that provides for a sales tax of 0.5 cent for countywide transportation improvements; approved by Orange County voters in November 1990.

Medium Visual Impact: Impacts sustained if features of a project alternative are readily discernable but do not dominate the landscape or detract from existing dominant features.

Megafauna: Mammoth, bison, horse, camel, dire wolf, and other large animals.

Megafossils: Fossils large enough to be seen with the unaided eye.

Mesoscale: Describes regional air quality analysis.

Microrelief: Relief forms that are details of larger surface forms, e.g., knolls, channel banks and spits, small sinkholes, and sand ripples.

Microscale: Describes local air quality analysis.

Midden: Refuse accumulation associated with prehistoric use of a site or area.

Miocene: The period between 23 and 5.3 million years before present.

Mitigation: Action or measure undertaken to minimize, reduce, eliminate, or rectify the adverse impacts of a project, practice, action, or activity.

Mitigation Bank: A large block of land that is preserved, restored, and enhanced for the purpose of mitigating for projects that take (disturb, injure, or kill) special-status species, wetlands or otherwise vegetated biological communities.

Mitigation Monitoring and Reporting Program (MMRP): Document outlining the strategy for implementation of the mitigation measures committed to in the EIR/EIS.

Mixed-Use Development: Development that incorporates residential and nonresidential uses.

MMRP: *See* **Mitigation Monitoring and Reporting Program.**

Modal: A transportation system defined on the basis of specific rights-of-way, technologies, and operational features.

Modal Alternative: A hypothetical, reasonable build alternative to the proposed HSR system consisting of expansion of highways and airports serving the same geographic areas.

Monitoring: The collection of information to determine the effects of resource management and to identify changing resource conditions or needs.

Monoculture: The cultivation of a single product to the exclusion of other uses of land.

N

NAD 83: North American Datum of 1983—The horizontal control datum for the United States based on the Geodetic Reference System 1980 and with a geocentric origin.

National Ambient Air Quality Standards (NAAQS): Federal standards stipulating the allowable ambient concentrations of specific criteria pollutants.

National Environmental Policy Act (NEPA): Federal legislation that establishes national policies and goals for the protection of the environment and requires federal agencies to consider the environmental impacts of major federal projects or decisions, to share information with the public, to identify and assess reasonable alternatives, to identify appropriate measures to mitigate potential impacts, and to coordinate efforts with other planning and environmental reviews taking place. Codified at: 42 U.S.C. § 4331 et seq.

NAVD 88: North American Vertical Datum of 1988—The vertical control datum established for surveying elevations in the United States based on the General Adjustment of the North American Datum of 1988.

NEPA: *See* **National Environmental Policy Act.**

Nitrogen Oxides (NO_x): A class of pollutant compounds that include nitrogen dioxide (NO_2) and nitric oxide (NO), both of which are emitted by motor vehicles. *See* **Criteria Pollutants.**

No Action: Under NEPA, refers to an alternative under which no action would be taken (no infrastructure would be built and no new management or operational practices would be instituted). *See* **No Project***.*

No Project: Under CEQA, refers to an alternative under which no action would be taken (no infrastructure would be built and no new management or operational practices would be instituted). *See* **No Action***.*

No Project Alternative: Represents the regional and state transportation system (e.g., highway, air, and conventional rail) as it is today and with implementation of programs or projects that are in regional transportation plans and have identified funds for implementation by 2035. The No Project Alternative represents the baseline conditions for comparison with the HSR alternatives.

Nonattainment: An air basin that exceeds federal or state standards for a particular pollutant. *See also* **Attainment***,* **Maintenance***.*

Non-Disturbance Exclusion Zones: Areas designated off-limits for construction and off-limits to construction personnel and equipment.

Non-Electrified Steel-Wheel-on-Steel-Rail Train: Conventional intercity diesel locomotive train equipment (e.g., Amtrak California Corridor trains).

Nonpoint Source Pollution: Pollution that collects from a wide area and cannot be traced to a single source. Examples include pesticides or fertilizers that wash into rivers or percolate through the soil into groundwater.

Notice of Intent (NOI): Formal notice published in the *Federal Register* by the federal lead agency stating that an environmental impact statement will be prepared for a proposed project.

Notice of Preparation (NOP): Formal notice issued by the state lead agency stating that an environmental impact report will be prepared for a proposed project.

Noxious Weed: A plant that has been defined as a pest by law or regulation. The state of California and the federal government maintain lists of plants that are considered threats to the well-being of the state or the country.

NPL/Superfund List: A federal list of sites that have been identified as posing an immediate public health hazard and where an immediate response is necessary.

Nuclear Magnetic Resonance (NMR): Property that magnetic nuclei have in a magnetic field and applied electromagnetic (EM) pulse or pulses that cause the nuclei to absorb energy from the EM pulse and radiate this energy back out. The energy radiated back out is at a specific resonance frequency that depends on the strength of the magnetic field and other factors.

O

Obsidian: A jet-black to gray, naturally occurring volcanic glass that is formed by the rapid cooling of viscous lava.

OCS: *See* **Overhead Contact System.**

Off-site: Outside of the HSR project footprint.

Ordinary High-Water Mark: The line on the shore of a body of water established by the fluctuation of water levels.

Overhead Contact System (OCS): A simple two-wire system, a messenger wire and a contact wire, with overhead wires supported by cantilevers and attached to poles alongside the tracks.

Overdraft: A condition where groundwater pumping exceeds the natural replenishment (recharge) to an aquifer.

Ozone (O_3): A photochemical oxidant that is a major cause of lung and eye irritation in urban environments.

P

Paleontological: Related to the study of life in past geologic time.

Paleontological Potential: The probability that a geologic unit contains fossils.

Paleontological Productivity: The relative abundance of fossils that have been encountered in a specific geologic unit.

Paleontological Resource Monitor: A person trained in the identification of fossils in the field and who monitors construction activities for paleontological resources.

Paleontological Resource Specialist (PRS): A person with advanced degree(s) in paleontology or paleobiology and trained in paleontological resources management. A PRS is usually responsible for compliance with the laws, ordinances, regulations, and standards addressing that resource.

Paleontological Resources: Fossils and the remains of ancient plants, animals, other organisms.

Paleontological Sensitivity: The probability of a geologic unit to yield fossils, based on historic paleontological productivity. Often used synonymously with **paleontological potential**.

Paleontologist: A scientist who studies fossils.

Paleosol: A layer of ancient or fossil soil buried beneath other sediments or deposits.

Pantograph Power Pickup: A device for collecting current from an overhead wire consisting of a hinged vertical arm operated by springs or compressed air and a wide, horizontal contact surface that slides along the wire.

Paralleling Station: A station that would work with the switching stations to balance the electrical load between tracks and to switch power off or on to either track in an emergency.

Parcel: A distinct, continuous portion or tract of land.

Park-and-Ride: Facility where HSR patrons can leave personal vehicles.

Partial Parcel Acquisition: A temporary taking of a parcel of land close to construction areas that requires the occupants to move during the construction period.

Particulate Matter: Liquid and solid particles of a wide range of sizes and compositions; of particular concern for air quality are particles smaller than or equal to 10 microns and 2.5 microns in size (PM_{10} and $PM_{2.5}$, respectively).

Particulate Pollution: Air pollution such as dust, soot, and smoke that is irritating but usually not poisonous. Particulate pollution also can include bits of highly toxic solid or liquid substances. Of particular concern are particles smaller than, or equal to, 10 microns (PM_{10}) or 2.5 microns ($PM_{2.5}$) in size.

Passing Track: A track connected to the main line on both ends that allows a train to stop for commercial reasons (in a station for example) or operating purposes (to deal with a delayed train or a train with technical issues) and that allows other trains to pass.

Perennial Stream: A stream that flows continually throughout the year.

Pesticide: Any substance intended to prevent the presence of, destroy, repel, or mitigate any pest. The term pesticide applies to insecticides and various other substances used to control pests, including herbicides.

Photogrammetry: The art, science, and technology of obtaining reliable information about physical objects and the environment through the process of recording, measuring, and interpreting images and patterns of electromagnetic radiant energy and other phenomena.

Pick-Up and Drop-Off: Facility for private and semi-private vehicles to drop-off or pick-up HSR patrons; could include facilities for taxis, private shuttles, and rental cars.

Plat: A plan or map of a plot of ground.

Platform: Station area adjacent to tracks where trains stop to allow passengers to board and alight.

Pleistocene: The period between 2.6 and 0.01 million years before present.

Pliocene: The period between 5.3 and 2.6 million years before present.

Point Source Pollution: Pollution that can be traced to a single source (e.g., a smokestack at a factory).

Polychlorinated Biphenyls (PCBs): Chemicals used in electrical transformers, hydraulic equipment, capacitors, and similar equipment.

Positive Train Control (PTC) Infrastructure: Integrated command, control, communications, and information systems for controlling train movements that improve railroad safety by significantly reducing the probability of collisions between trains, casualties to roadway workers, and damage to equipment.

Positive Train Control (PTC) Systems: The Rail Safety Improvement Act requires that railroads implement PTC systems to prevent train-to-train collisions on certain rail lines by the end of 2015.

Pothole/Test Pit: An excavation to expose an underground facility.

Poverty Level: The income at which a family or individual is considered poor. In 2009 the U.S. Census Bureau defined the poverty level for a family of four as an income of $21,954 or less.

Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

Preferred Alternative: The alternative identified as preferred by the lead agencies.

Prehistoric Archaeological Sites: Places where Native Americans lived or carried out activities during the prehistoric period (as late as AD 1769).

Prime Farmland: Rural land that has the best combination of physical and soil chemistry characteristics for producing food, feed, forage, fiber, and oilseed crops, and is available for these uses.

Program-Level/Programmatic: Refers to a CEQA or NEPA environmental review that covers the broad spectrum of a large, complex, regionally extensive effort comprised of a number of smaller, regionally focused projects or phases.

Project Footprint: The area needed to construct, operate and maintain all permanent HSR features (including tracks and guideway structures, train signaling and controls and communications facilities, traction power distribution and substations, switching and paralleling stations, passenger platforms and stations, maintenance-of-way facilities, maintenance facilities, HSR perimeter security controls, passenger station access, HSR facility operation or maintenance access, sound walls or other peripheral features owned and maintained by the Authority), freight or passenger or transit railroad grade separations, roadway grade separations and adjoining street or intersection changes, contiguous access to severed parcels, new utility features, existing utility relocations, access to new or relocated utility features, drainage facilities, any other physical changes within the area needed to construct and operate HSR, and HSR property rights or licenses to accommodate HSR construction, operation and maintenance (temporary and permanent ground or aerial fee properties, easements or licenses for HSR facility and associated feature sites, HSR operations and maintenance activities, operation or maintenance access, utility connections and maintenance, HSR stormwater and wildlife management features, construction activities, mobilization, staging and access).

Project-Level: Refers to more detailed site-specific environmental analysis focusing on a single project that is part of a larger program.

Project Viewshed: The area within which the project alternatives could be visible.

Public Transportation: Includes bus, trolley bus, streetcar or trolley car, subway or elevated, railroad, ferryboat, and taxicab service.

Purpose and Need: The reason(s) why a project or action is undertaken, and the need(s) it is intended to meet or fulfill.

Q

Qualified Paleontologist: *See* **Paleontological Resources Specialist.**

Quality Level: A level of accuracy scale used (1) to identify the location of underground and above ground utility facility information needed to develop capital projects and (2) for acquiring and managing that level of information during the project development process.

Quantum System: A route selection and optimization tool that carries out automated three-dimensional alignment searches and corridor screening based on client- or user-specified geometry, constraints, and cost parameters.

R

Radio Frequency: The frequency range of the electromagnetic spectrum used for radio communication.

Rail Guideway: A track that supports and physically guides high-speed trains.

Rail Line: A length of railroad track and railbed.

Railbed: The substructure of a railroad, underlying the tracks.

Ranchette: A rural or semi-rural ranch-style residence with a comparatively small acreage.

Reactive Organic Gas (ROG): Reactive **Hydrocarbon** pollutants.

Reconductoring: The upgrade of an existing electrical power transmission or distribution line to increase current carrying capacity.

Regional Transportation Improvement Plan (RTIP): A listing of all transportation projects proposed over a six-year period for a given region. The regional transportation improvement program is prepared to implement projects and programs listed in the **Regional Transportation Plan** and is developed in compliance with state and federal requirements.

Regional Transportation Plan (RTP): A long-range (20+ year) transportation plan. The regional transportation plan identifies major challenges as well as potential opportunities associated with growth, transportation finances, the future of airports in the region, and impending transportation system deficiencies that could result from growth anticipated in the region. There are typically two components of the RTP: a financially constrained and financially unconstrained version. The financially constrained version of the RTP includes projects and programs that fit within existing and planned funding sources.

Relocations: The removal, rearrangement, reinstallation, or adjustment of a utility facility required by a transportation improvement project.

Retention Pond: A pond designed to hold and infiltrate most or all of the runoff that it receives.

Remnant: The portion of a property that is not acquired for HSR purposes.

Richter Scale: A logarithmic scale measuring the severity of earthquakes based on the magnitude of ground motion.

Ridership: The number of people who ride a transportation system.

Right-of-Way: A legal right of passage over a defined area of real property. In transit usage, the corridor along a roadway or railway that is controlled by a transit or transportation agency/authority.

Riparian: Relating to, living, or located on the bank of a natural water course, lake, or tidewater.

Riparian Corridor: The area along a natural water course, lake, or tidewater where wildlife moves or migrates.

Riprap: Randomly placed rock or concrete used to strengthen an embankment or protect it from **erosion.**

Rock or Geologic Unit: A body of rock or unconsolidated sediment that has a distinct origin and distinctive attributes allowing its distribution to be mapped.

Rolling Stock: Wheeled railway vehicles.

Route Mile: The distance traveled over tracks between two points. Route miles may have one or multiple sets of parallel tracks

Ruderal: Weedy vegetation, commonly including or dominated by introduced species, characteristic of areas where native vegetation has been disturbed or removed.

Runoff: The flow of water over land from rain, snowmelt, or other sources.

S

SCADA: *See* **Supervisory Control and Data Acquisition.**

Scale: A graduated line representing a proportionate size.

Scarp: The inner slope of a ditch.

Scenic Corridor: A corridor with landscapes and vistas of high scenic quality.

Scoping: A process used under CEQA and NEPA to determine the scope of issues to be addressed and for identifying the significant issues related to the proposed action or project to be addressed in an EIR (under CEQA) or an EIS (under NEPA).

Scour: Erosion caused by fast-flowing water.

Screenline: An imaginary line across parallel roadways that defines a zone of analysis.

Seasonal Riverine: A classification of wetland found along rivers and streams.

Section 4(f): Provisions originally enacted as Section 4(f) of the U.S. Department of Transportation Act of 1966 codified in 49 United States Code, Subtitle I, Section 303(c). Section 4(f) addresses the potential for conflicts between transportation needs and the protection of land for recreational use and resource conservation by providing protection for publicly owned parkland, recreation areas, and historic sites from use. Specifically, the provisions prohibit the Secretary of Transportation from approving any program or project that would require the use of any publicly owned land from a public park, recreation area, wildlife or waterfowl refuge, or land of an historic site of national significance as determined by the officials having jurisdiction over these lands unless there are no feasible and prudent alternatives to the use of these lands. In addition, a proposed program or project must include all possible planning to minimize harm resulting from the proposed use.

Section 6(f): Section 6(f) of the Land and Water Conservation Fund Act of 1964 prohibits the conversion of property acquired or developed with funds granted through the act to a non-recreational purpose without the approval of the National Park Service. Section 6(f) directs the Department of the Interior to ensure that replacement lands of equal value (monetary), location, and usefulness are provided as conditions to such conversions. State and local governments often obtain grants to acquire or make improvements to parks and recreation areas (16 U.S.C. § 460-4 through 460-11, September 3, 1964, as amended 1965, 1968, 1970, 1972–1974, 1976–1981, 1983, 1986, 1987, 1990, 1991, 1993–1996). Consequently, where such conversions of Section 6(f) lands are proposed, replacement land must be provided.

Sedimentary Rock: Rock resulting from the consolidation of sediment.

Sedimentary Rock Units: Rock units composed of sediment, as opposed to those composed of igneous rocks (volcanic or granite). Sedimentary rock units yield fossils.

Sediments: Fragments of material originating either from the physical or chemical weathering of rocks and minerals, from the decomposition of organic matter, and from atmospheric fallout. Clay, mud, and sand are all types of sediment.

Seiche: Oscillation or "sloshing" of water in a lake, bay, or other enclosed body as a result of landsliding or seismic ground shaking.

Seismic Monitoring Devices: Devices that detect ground movements and automatically shut down power to high-speed trains and apply the on-board emergency brakes.

Senate Bill 45: A law that consolidates various funding programs into the **State Transportation Improvement Program (STIP)** and increases accountability for programming and delivery of STIP projects to the regions in the state and the various Caltrans districts.

Sensitive Natural Communities: Communities of plants and wildlife interacting in the same ecosystem whose extent has been much reduced in the state and which are locally rare.

Sensitive Receiver: Noise-sensitive locations where increased annoyance can occur, such as residences, schools, hotels/motels, medical facilities, or other vibration-sensitive receivers.

Sensitive Receptors: Locations considered more sensitive to adverse effects from air pollution (e.g., residences; preschools and kindergarten through grade 12 schools; daycare centers; health-care facilities such as hospitals, retirement homes, and nursing homes; and parks and/or playgrounds).

Sensitivity Analysis: An analysis that assesses how sensitive the outcomes predicted by modeling are to changes in different model inputs (assumptions or variables).

Service: The portion of the electrical, gas, water, or sewer system that connects a customer, usually at the meter location, to the utility distribution or supply system.

Shadow Impact: A shadow impact ranking would be high if a new (not existing) elevated structure were within 75 feet (23 meters) of residential or open space, natural areas, or parkland.

Shared Right-of-Way: An HSR alignment where HSRs operate in proximity to other transportation systems, including conventional passenger railroads and freight railroads, without sharing tracks. Also includes highways.

Shared Use Corridor: A segment along the HSR alignment where high-speed trains operate on exclusive tracks located along rail corridors or rights-of-way where conventional passenger and freight railroads operate.

Shared Use Track: Segment along the HSR alignment where HSRs operate with other passenger railroads (i.e., Caltrain, MetroLink, and Amtrak), on the same track.

Shinkansen: The Japanese high-speed train.

Significant: In CEQA usage, describes an impact that is sufficiently adverse, intense, or prolonged to require mitigation. For NEPA usage, see 40 C.F.R. Part 1508.27.

Slab Track: Railways installed on concrete slabs for support.

Sleeve: A pipe in which a pipeline or conduit is inserted.

Snowbelt: A North American region, much of which lies downwind of the Great Lakes, where heavy snowfall is particularly common on predominantly eastern and southern shores of the Great Lakes.

Society of Vertebrate Paleontology: An international society of paleontologists, with an emphasis on vertebrate paleontology.

Soil Densification: Soil compaction that can lead to erosion.

South Coast Air Quality Management District: The regional regulatory agency with primary responsibility for improving air quality in the South Coast Air Basin.

Special Provision: Specific clauses setting forth the conditions or requirements peculiar to the work and supplement the project's standard specifications.

Special-Status Plant Communities: Significant or rare vegetation types (California Department of Fish and Game [CDFG] 2003) or plant communities that are of limited distribution statewide or within a county or region.

Special-Status Species: Plants and animals that are legally protected under the Federal Endangered Species Act of 1973, the California Endangered Species Act, or other regulations, such as those species that meet the definitions of rare or endangered under CEQA Guidelines Sections 15380 and 15125.

Spiral: A curve of variable radius used to connect a straight section of track with the radius of the body of the curve. Sometimes called a transition or a transition spiral in European publications.

State Implementation Plan (SIP): Statewide plan for complying with the federal Clean Air Act. The SIP consists of narrative, rules, and agreements that California will use to clean up polluted areas.

State Streambeds: CDFG has not released an official definition of lake or streambed and therefore the extent of the area regulated under Section 1602 remains undefined. However, CDFG jurisdiction generally includes the streambed and bank, together with the adjacent floodplain and riparian vegetation.

State Transportation Improvement Program (STIP): A multi-year capital improvement program of transportation projects on and off the state highway system, funded with revenues from the State Highway Account and other funding sources. STIP programming generally occurs every two years.

Station: Area that would provide intermodal connectivity, drop-off facilities, an entry plaza, a station house area for ticketing and support services, a station box where passengers wait and access the HSR, and parking facilities.

Stormwater Pollution Prevention Plan (SWPPP): A plan that specifies site management activities to be implemented during site development, including construction stormwater best management practices, erosion and sedimentation controls, dewatering (nuisance water removal), runoff controls, and construction equipment maintenance.

Straddle Bents: A pier structure that spans the functional/operational right-of-way limit of a roadway, highway, or railway.

Strata: Geologic units composed of sedimentary rocks usually thought of as overlying one another in layer-cake fashion.

Stratigraphically Long-Ranging: Fossils that are present in multiple geologic units.

Strike-Slip Fault: A fault along which the dominant direction of movement is parallel to the fault trace (the expression of the fault on the ground surface).

Stub End: A track that terminates at one end.

Subsidence: Sinking or lowering of the ground surface.

Subsistence Remains: Remains that include the inedible portions of foods, such as animal bone and shell, and edible parts that were lost and not consumed, such as charred seeds.

Sulfur Oxides (SOx): Sulfur-oxygen compounds that include the important criteria pollutants sulfur dioxide (SO_2) and sulfur trioxide (SO_3).

Superelevation: The difference in elevation between the outside rail of the curve and the inside rail of the curve measured between the highest point on each rail head. Normally called *cant* in European publications.

Supervisory Control and Data Acquisition (SCADA): A function for the management and acquisition of project components that is part of the central control facility.

Surficial Geology: Unconsolidated Quaternary-era geologic materials lying on top of bedrock. Common surficial materials include sand and gravel, glacial tills, and clay and silts.

Swale or Sheetflow Runoff: Runoff from a low tract of land, especially one that is moist or marshy.

Switch: A mechanical installation enabling trains to be guided from one track to another at a railway junction.

Switch Frog: The point in the switch where two rails cross. The frog is designed to ensure the wheel crosses the gap in the rail without dropping into the gap; the wheel and rail profile ensures that the wheel is always supported by at least one rail.

Switching Station: A station that would work with the paralleling station to balance the electrical load between tracks and to switch power off or on to either track in an emergency.

T

Take: To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct (as defined in Section 3 of the **Federal ESA**).

Taxon: A general term for a named group of related organisms.

Tectonic Activity: Movement of tectonic plates that result in earthquakes, volcanoes, and mountain building.

Terminal Station: The first or last station of a passenger railway route.

Tesla: Unit of measure describing the strength of a magnetic field. *See also* **Gauss**.

Thermocline: A thin but distinct layer in a large body of water such as an ocean or lake in which temperature changes more rapidly with depth than it does in the layers above or below.

Tiering: Refers to the practice of addressing general issues in broader environmental impact reports or statements, such as **Program-Level** documents, and providing more detailed site-specific analyses in subsequent (typically **Project)** documents that incorporate the initial broad analysis by reference.

Topographic Map: A map of the surface features of the earth.

Total Organic Gases (TOG): A pollutant classification that includes all **Hydrocarbons**, both reactive and non-reactive.

Track Mile: The literal number of miles of single track.

Trackway: The route of a train.

Trackwork: The design of train tracks.

Traction Power Supply Station (TPSS): An electrical substation that supplies power to the HSR System.

Traditional Cultural Properties and Resources (TCP): Places associated with the cultural practices or beliefs of a living community that are rooted in that community's history. Examples of TCPs include, but are not limited to, any place where people practice a ritual activity or festival; any place where something happened that is of significance to a group or community and is referred to in stories; any place that is a vital and beloved part of the community and that may give the community a special identity or defining character.

Trainset: A complete unit of **Rolling Stock** that makes up a single train.

Transit-Dependent Population: The population over the age of 16 (workers) who use **Public Transportation** to travel to and from work.

Transit Node: A connection, station, or terminal on a transit network.

Transportation Demand Management: The operation and coordination of various transportation system policies and programs to manage travel demand to make the most efficient and effective use of existing transportation services and facilities.

Transportation System Management: Actions that improve the operation and coordination of transportation services and facilities to realize the most efficient use of the existing transportation system.

Transverse: A facility passing from one side of the right-of-way to the other side of the right-of-way.

Travel Time: The time spent traveling from a place of origin to a place of destination. *Total travel time* includes the time required to reach a station or an airport, time spent waiting for the next scheduled train or flight, time spent getting to the boarding area, time spent checking and retrieving luggage, time spent getting a rental car or taxi, as well as time spent to reach the final destination.

Tributary Watercourse: A stream feeding a larger stream or lake.

Trinomial: An alphanumeric abbreviation for a previously identified historic or prehistoric resource, such as CA-ORA-1352, representing the state (e.g., California [CA]), the county (e.g., Orange [–ORA]), and a unique number assigned by the State Historic Preservation Office (e.g., -1352).

Tsunamis: Waves that travel in the open ocean and that are caused by an undersea earthquake, landslide, or volcanic activity.

U

Unavoidable: In CEQA and NEPA usage, describes an impact that cannot be entirely avoided, reduced, or compensated for.

Unbalance, Unbalanced Superelevation: The difference between the superelevation and equilibrium superelevation. In European publications, unbalance is called cant deficiency if the actual superelevation is less than the equilibrium superelevation, and is called excess cant if the actual superelevation is greater than the equilibrium superelevation.

Unique Farmland: Farmland with soils of lower quality than either **Prime Farmland** or **Farmland of Statewide Importance**, but still used for the production of crops. Unique farmlands are usually irrigated, but may include non-irrigated orchards or vineyards in some of California’s climate zones. To qualify as unique farmland, a property must have been in crops at some time during the previous 4 years.

Uplift: The action of a portion of the earth’s surface as it rises above adjacent areas, an area of higher elevation than surrounding areas; an area that has been uplifted.

V

Value Capture: A station area development principle that is a condition for selecting an HSR station site.

Variance: Approved deviation, or exception, from a minimum design criteria or standard.

V/C Ratio: Volume to capacity ratio; describes the relationship between the amount of traffic a roadway was designed to carry and the amount of traffic it actually carries. Related to the **Level of Service (LOS)** the roadway can provide.

Vertebrate: Organisms with a vertebral column.

Vernal Pool: An ephemeral wetland that predictably forms in permanent basins during the cooler part of the year but which turns dry during summer.

Vertical Curve: The transition between grades is normally parabolic in the United States and Asian practices and circular arc radii in European practices.

Very High Speed Steel-Wheel-on-Steel-Rail Train: A train capable of maximum operating speeds near 220 mph using steel-wheel-on-steel-rail technology.

Viaduct: A bridge that conveys a road or a railroad over a valley often constructed of a series of arches supported by piers.

Viewer Group: Roadway/highway/rail users, residents, commercial viewers, office viewers, park and trail users, and agricultural and industrial workers within a viewshed.

Viewshed: The total area visible from a single observer position, or the total area visible from multiple observer positions. Viewsheds include scenes from highways, trails, campgrounds, towns, cities, or other viewer locations. Viewshed types include corridor, feature, or basin viewsheds.

Visual Character: The physical attributes of the landscape.

Visual Intactness: The aesthetic integrity of the visual environment and its freedom from encroaching elements.

Visual Quality: The character or inherent features of a viewshed.

Visual Resources: The natural and artificial features of a landscape that characterize its form, line, texture, and color.

Visual Unity: The visual coherence and compositional harmony of a landscape considered as a whole.

Visual Vividness: The visual power or memorability of landscape components as they combine in patterns experienced by the viewer.

Vividness: *See* **Visual Vividness.**

Volt: Standard unit of measure for electrical potential.

W

Waterbody: Any significant accumulation of water. The term *body of water* most often refers to large accumulations of water, such as oceans, seas, and lakes, but it may also include smaller pools of water such as ponds, puddles, or wetlands.

Waters of the State: Isolated wetlands that may not be subject to regulations under federal law (as defined by the Porter-Cologne Water Quality Control Act (§ 1305(e)). An area is a wetland if, under normal circumstances, it (1) is saturated by ground water or inundated by shallow surface water for a duration sufficient to cause anaerobic conditions within the upper substrate; (2) exhibits hydric substrate conditions indicative of such hydrology; and (3) either lacks vegetation or the vegetation is dominated by hydrophytes (San Francisco Estuary Institute 2009).

Waters of the United States (U.S.): The federal Clean Water Act defines waters of the U.S. as (1) All waters that are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters subject to the ebb and flow of the tide; (2) All interstate waters including interstate wetlands; and (3) All other waters, such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce (33 C.F.R. Part 328.3[a]).

Water-Contact Recreation: Recreational activities in which contact with the water is intended or likely, such as swimming, water-skiing, and fishing.

Watershed: The area that contributes water to a drainage system or stream.

Watt: Standard unit of measure for electrical power.

Wayside Power: Electrical power provided from the utility grid to the electrified railroad right-of-way at convenient locations from the side of the rail tracks or corridor.

Weir: A small dam that restricts flow in a stream to raise the water level or diverts flow into a desired course.

Wet Utility: A pipeline that conveys liquid through gravity or pressured systems for public purposes (i.e., water and wastewater).

Wetland: An area of land with soil that is saturated with moisture, either permanently or seasonally. According to the *U.S. Army Corps of Engineers Wetland Delineation Manual*, three criteria must be satisfied to classify an area as a jurisdictional wetland: (1) a predominance of plant life that is adapted to life in wet conditions (hydrophytic vegetation), (2) soils that saturate, flood, or pond long enough during the growing season to develop anaerobic conditions in the upper part (hydric soils), and (3) permanent or periodic inundation or soils saturation, at least seasonally (wetland hydrology).

Wildlife Corridor: A belt of habitat that is essentially free of physical barriers such as fences, walls, and development, and connects two or more larger areas of habitat, allowing wildlife to move between physically separate areas.

Wingwall: A wall at the abutment of a bridge that extends beyond the bridge to retain the earth behind the abutment.

Wye Connection: A railway that connects different sections of track. The transition to a wye requires splitting two guideways into four guideways crossing over one another before the wye legs diverge in opposite directions to allow bidirectional travel.

Y

Yard Track: Dead-end track dedicated to operation needs and connected to a passing track, never to the main railway.

14 INDEX

The Index lists major topics, organizations, and terms that may be used as a cross-reference to the California High-Speed-Rail (HSR) section project environmental impact report/environmental impact statement (EIR/EIS). In developing this list for each HSR section, the Regional Consultant (RC) should consider topics, places, groups, specific subjects, or key words that were continuously brought up during the EIR/EIS process and during public outreach meetings, or are important aspects of the Administrative Record. These may include specific community or neighborhood names, schools, demographics, such as low-income populations or minority groups, etc. Consider the topics, groups, and terms that help the project EIR/EIS be a reader-friendly document for general and technical audiences and useful reference for project information.

The RC shall compile and prepare the whole of the Index and Chapter 14 of the project EIR/EIS, consisting of the term listing and reference pages.

Below are example listings from the *Fresno to Bakersfield Section Final EIR/EIS* (April 2014).

M

P

T

15 ACRONYMS AND ABBREVIATIONS

This list of acronyms and abbreviations identifies and defines common terms used in this guidance for preparing California High-Speed-Rail (HSR) project-level environmental impact report/environmental impact statement (EIR/EIS) documents. The Regional Consultant shall review and modify the list as needed to include all terms pertinent to the specific HSR section or to remove terms not used in the specific HSR section. The Authority's *Style and Branding Guide* provides detailed direction on requirements for acronyms and abbreviations used in all official Authority communications and documents. The RC shall compile and prepare this chapter of the EIR/EIS.

°C	degree(s) Celsius
°F	degree(s) Fahrenheit
AAI	All Appropriate Inquiry
AASHTO	American Association of State Highway and Transportation Officials
AB	(California) Assembly Bill
ac	alternating current
AC	air conditioning
ACGIH	American Conference of Government Industrial Hygienists, Inc.
ACHP	Advisory Council on Historic Preservation
ACM	asbestos-containing material
ACS	(U.S.) American Community Survey
ADA	Americans with Disabilities Act
ADRP	archeological data recovery program
ADT	average daily traffic
AJD	approved jurisdictional determination
aka	also known as
ALUCP	Airport Land Use Compatibility Plan
AMP	Airport Master Plan
ANSI	American National Standards Institute
APCD	air pollution control district
APE	area of potential effect
APN	Assessor's Parcel Number
APS	alternate planning strategy
APTA	American Public Transportation Association
APZ	Agricultural Protection Zone
AQMD	air quality management district
AREMA	American Railway Engineers and Maintenance of Way Association
ARPA	Archaeological Resources Protection Act
ARRA	American Recovery and Reinvestment Act
ASCE	American Society of Civil Engineers

ASR	Archeological Survey Report
AST	aboveground storage tank
ASTM	ASTM International (formerly known as the American Society for Testing and Materials)
AT&SF	Atchison, Topeka, and Santa Fe Railroad
ATC	automatic train control
ATCM	Airborne Toxic Control Measure
ATP	Archaeological Treatment Plan
Authority	California High-Speed Rail Authority
B&B	Brown and Bryant
B.P.	year(s) before the present
BAC	Business Advisory Council
BACT	best available control technology
BA-CV MMRP	Bay Area-Central Valley Mitigation Monitoring and Reporting Program
BART	Bay Area Rapid Transit
Basin Plan	Water Quality Control Plan for the Tulare Lake Basin
Bay Area	San Francisco Bay Area
BCA	benefit-cost analysis
BCDC	Bay Conservation and Development Commission
BETP	built-environment treatment plan
BFD	Bakersfield Fire Department
bgs	below ground surface
BIOS	Biogeographic Information and Observation System
BLM	Bureau of Land Management
BMP	best management practice
BNSF	Burlington Northern and Santa Fe Railroad
BRMP	Biological Resources Management Plan
Btu	British thermal unit
C&D	construction and demolition
C.F.R.	Code of Federal Regulations
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAG	County Association of Governments
Cal EMA	California Emergency Management Agency
CAL FIRE	California Department of Forestry and Fire Protection
Cal. Code Regs.	California Code of Regulations
Cal. Fish and Game Code	California Fish and Game Code
Cal. Health and Safety Code	(California) Health and Safety Code

Cal. Public Res. Code	California Public Resources Code
Cal. Streets and Highway Code	California Streets and Highway Code
Cal. Water Code	California Water Code
Cal-EPA	California Environmental Protection Agency
Cal-ISO	California independent system operator
Cal-OSHA	California Occupational Safety and Health Administration
CalRecycle	California Department of Resources Recycling and Recovery
CalSTA	California State Transportation Agency
CALTRANS	California Department of Transportation
CARB	California Air Resources Board
CASQA	California Stormwater Quality Association
CBOC	California Burrowing Owl Consortium
CCAA	California Clean Air Act
CCC	California Coastal Commission
CCTV	closed-circuit television
CDFA	California Department of Food and Agriculture
CDFC	California Fish and Game Code
CDFW	California Department of Fish and Wildlife
CDMG	California Division of Mines and Geology
CDOF	California Department of Finance
CDP	census designated place
CDSM	cement deep soil mixing
CEC	California Energy Commission
CEDD	California Employment Development Department
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	California Endangered Species Act
CFC	chlorofluorocarbon
CGS	California Geological Survey
CH_4	methane
CHA	collision hazard analysis
CHL	California Historical Landmark
CHRIS	California Historical Resources Information System
CHSR	California High-Speed Rail
CHSRA	California High-Speed Rail Authority (see Authority)
CIA	Community Impact Assessment
CIDH	cast-in-drill hole

CL	Centerline
CLUP	Comprehensive Land Use Plan
Cm	centimeter(s)
CMA	Congestion Management Agency
CMP	Congestion Management Plan
CMS	changeable message signs
CNDDB	California Natural Diversity Database
CNEL	community noise equivalent level
CNG	compressed natural gas
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalents
COG	Council of Governments
CP	construction package
CPCN	Certificate of Public Convenience Necessity
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Resources
CRWQCBCVR	California Regional Water Quality Control Board, Central Valley Region
CS	Cambridge Systematics, Inc.
CSE	Countywide Siting Element
CSHP	construction safety and health plan
CSMP	Corridor System Management Plan
CT	computed tomography
CTP	Construction Transportation Plan
CTS	California tiger salamander
CUPA	Certified Unified Program Agency
CVFPB	Central Valley Flood Protection Board
CVFPP	Central Valley Flood Protection Plan
CVP	Central Valley Project
CVR	Cross Valley Railroad
CWA	Clean Water Act
CWHR	California Wildlife Habitat Relationship System
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Plan
DB	design-build
dB	decibel(s)
dBA	A-weighted decibel(s)
DBE	Disadvantage Business Enterprise
Dc	direct current

DCE	dichloroethylene
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DE	diesel exhaust
DEIR	Draft Environmental Impact Report
DEIS	Draft Environmental Impact Statement
DOC	California Department of Conservation
DOF	California Department of Finance (see also CDOF)
DOGGR	(California) Division of Oil, Gas, and Geothermal Resources
DPM	diesel particulate matter
DPR	Department of Parks and Recreation
DSOD	Division of Safety of Dams
DTSC	Department of Toxic Substances Control
DVBE	Disabled Veterans Business Enterprise
DWR	California Department of Water Resources
EA	Environmental Assessment
EDMS	Emission and Dispersion Modeling System
EDR	Environmental Data Resources, Inc.
EIR	environmental impact report
EIS	environmental impact statement
EISA	Energy Independence and Security Act
EJ	environmental justice
ELF	extremely low frequency
EMC	Electromagnetic Compatibility
EMCPP	Electromagnetic Compatibility Control Plan
EMF	electromagnetic field
EMFAC	emission factors model
EMI	electromagnetic interference
EMMA	Environmental Mitigation Management and Assessment
EMT	emergency medical technician
EMU	electric multiple unit
EO	(California) Executive Order
EOI	Expressions of Interest
EOP	emergency operating procedure
EPCRA	Emergency Planning and Community Right-to-Know Act
ER	ecological reserve
ERA	environmentally restricted area
ERF	Effective Response Force
ESA	environmentally sensitive area

ESRP	Endangered Species Recovery Program
ESU	evolutionary significant unit
FAA	Federal Aviation Administration
FAT	Fresno Air Terminal
FCC	Federal Communications Commission
FCS	First construction segment
Fed. Reg.	Federal Register
FEIR	final environmental impact report
FEIS	final environmental impact statement
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FESA	Federal Endangered Species Act
FHWA	Federal Highway Administration
FIRE	finance, insurance, and real estate
FLPMA	Federal Land Policy and Management Act
FLSP	fire/life safety program
FMFCD	Fresno Metropolitan Flood Control District
FMMP	Farmland Mapping and Monitoring Program
FOE	Finding of Effect Report
FPPA	Farmland Protection Policy Act
FRA	Federal Railroad Administration
Fresno COG	Council of Fresno County Governments
FSZ	Farmland Security Zone
ft	foot (feet)
FTA	Federal Transit Administration
FTIP	Federal Transportation Improvement Programs
FUSD	Fresno Unified School District
g	acceleration of gravity
G	gauss
GAMAQI	Guide for Assessing and Mitigating Air Quality Impacts
GAO	Government Accountability Office
GC	general conformity
GET	Golden Empire Transit
GHG	greenhouse gas
GHz	gigahertz
GIS	geographic information system
GNIS	geographic names information system
gpd	gallon(s) per day
gpm	gallon(s) per minute
GPS	global positioning system

GSSPR	geology, soils, seismicity, and paleontological resources
GWh	gigawatt-hour
GWP	global warming potential
HABS	Historic American Building Survey
HAER	Historic American Engineering Record
HALS	Historic American Landscape Survey
HAPR	Historic Architectural Property Report
HASR	Historic Architectural Survey Report
hazmat	hazardous material
HCM	Highway Capacity Manual
HCP	habitat conservation plan
HF	high frequency
HFC	hydrofluorocarbons
HFE	hydrofluorinated ether
HMF	heavy maintenance facility
HMMP	Habitat Mitigation and Monitoring Plan
HOV	high-occupancy vehicle
hp	horsepower
HPSR	Historic Properties Survey Report
HR	hydrologic region
HS	high speed
HSR	high-speed rail
HST	high-speed train
HUD	(U.S.) Department of Housing and Urban Development
Hz	hertz
I	interstate
IBC	International Building Code
ICC	International Code Council
ICE	InterCity Express
ICES	International Committee on Electromagnetic Safety
ICNIRP	International Commission on Non-Ionizing Radiation Protection
ICS	Initial Construction Section
ID	Irrigation District
IEEE	Institute of Electrical and Electronic Engineers
IOS	Initial Operating Section
IRIS	Integrated Risk Information System
IT&TC	(Shafter) International Trade and Transportation Center
JD	jurisdictional determination
JRP	JRP Historical Consulting Services
KART	Kings Area Rural Transit

KCAG	Kings County Association of Governments
KCFD	Kern County Fire Department
KCOG	Kern Council of Governments
KHSD	Kern High School District
kHz	kilohertz
km	kilometer(s)
kph	kilometer(s) per hour
KRCD	Kings River Conservation District
KRT	Kern Regional Transit
kV	kilovolt
kV/m	kilovolt(s) per meter
KVP	key viewpoint
KWH	kilowatt hour
LAC	Local Advisory Committee
LACM	Los Angeles County Museum of Natural History
LADWP	Los Angeles Department of Water and Power
LBP	lead-based paint
LCP	Local Coastal Plan
L_{dn}	day-night sound level, dBA
LEDPA	least environmentally damaging practicable alternative
LEED	Leadership in Energy and Environmental Design
LEP	limited English proficiency
L_{eq}	equivalent sound level, dBA
$L_{eq}(h)$	equivalent sound level for a 1-hour period, dBA
LESA	land evaluation and site assessment
L_{max}	maximum sound level, dBA
LOS	level of service
LOSSAN	Los Angeles to San Diego rail corridor
LPG	liquefied petroleum gas
LRMP	Land Resource Management Plan
LSA	lake and streambed alteration
LT	long-term measurement
LUST	leaking underground storage tank
LWCF	Land and Water Conservation Fund
m^3	cubic meter(s)
maglev	magnetic levitation
MBHCP	Metropolitan Bakersfield Habitat Conservation Plan
MBTA	Migratory Bird Treaty Act
MCL	maximum contaminant level
mG	milligauss

mgd	million gallon(s) per day
MHz	megahertz
MM	mitigation measure
MMAA	Master Mutual Aid Agreement
MMBtu	million Btu
MMcf	million cubic feet
MMEP	Mitigation Monitoring and Enforcement Plan
MMRP	Mitigation Monitoring and Reporting Program
MMT	million metric tons
MOA	memorandum of agreement
MOIF	maintenance of infrastructure facility
MOIS	maintenance of infrastructure siding
MOU	memorandum of understanding
MOWF	maintenance-of-way facility
MPE	maximum permissible exposure
mpg	miles per gallon
mph	miles per hour
MPO	Metropolitan Planning Organization
MRF	materials recovery facility
MRI	magnetic resonance imaging
MRZ	mineral resource zone
MS4	Municipal separate storm sewer system
MSAT	mobile-source air toxics
MTA	Metropolitan Transportation Authority
MTBE	methyl tertiary butyl ether
MW	megawatt
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAC	noise abatement criteria
NAHC	Native American Heritage Commission
NASA	National Aeronautics and Space Administration
NAVD 88	North American Vertical Datum of 1988
NCCP	Natural Communities Conservation Plan
NCRP	National Council on Radiation Protection
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NF_3	nitrogen trifluoride
NFMA	National Forest Management Act
NFPA	National Fire Protection Association
NHL	National Historic Landmark

NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NIEHS	National Institute of Environmental Health Sciences
NKWSD	North Kern Water Storage District
NMFS	National Marine Fisheries Service
NMR	nuclear magnetic resonance
NO	nitric oxide
NO_2	nitrogen dioxide
NOA	naturally occurring asbestos
NOAA	National Oceanic and Atmospheric Administration
NOD	notice of determination
NOI	notice of intent
NOP	Notice of Preparation
NOR	North of the River Parks and Recreation District
NORSD	North of the River Sanitation District
NO_x	nitrogen oxide(s)
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List (Superfund)
NPPA	Native Plant Protection Act
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRPA	National Recreation and Park Association
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
O&M	operating and maintenance
O_3	ozone
OCC	Operations Control Center
OCR	open space, conservation, and recreation element
OCS	overhead contact system
OEHHA	Office of Environmental Health Hazard Assessment
OHP	(California) Office of Historic Preservation
OSHA	Occupational Safety and Health Administration
OSHPD	Office of Statewide Health Planning and Development
OXY	Occidental Petroleum Corporation
PA	programmatic agreement
PAH	polycyclic aromatic hydrocarbon
PARCS	Parks, After School, Recreation, and Community Services
Pb	lead
PCB	polychlorinated biphenyl

PCC	Portland Cement Concrete
PCE	perchloroethylene (synonym: tetrachloroethene)
PCM	project and construction management
PEC	potential environmental concern
PER	Paleontological Evaluation Report
PFC	perfluorocarbon
PG&E	Pacific Gas and Electric Company
PGA	peak ground acceleration
PHA	preliminary hazard analysis
PHMSA	(U.S. Department of Transportation) Pipeline and Hazardous Materials Safety Administration
PIM	public information meeting
PIR	Paleontological Identification Report
PJD	preliminary jurisdictional determination
PL	public law
PM	particulate matter
PM_{10}	particulate matter smaller than or equal to 10 microns in diameter
$PM_{2.5}$	particulate matter smaller than or equal to 2.5 microns in diameter
PMT	Program Management Team
ppm	part(s) per million
PPV	peak particle velocity
PRG	Peer Review Group
PRM	paleontological resources monitor
PRMMP	Paleontological Resource Monitoring and Mitigation Plan
PRPA	Paleontological Resources Preservation Act
PRS	paleontological resources specialist
PTC	Positive Train Control
PTE	permission to enter
PTO	permit to operate
QI	Qualified Investigator
RC	Regional Consultant
RCD	Resource Conservation District
RCM	Roadway Construction Model
RCRA	Resource Conservation and Recovery Act
RF	radio frequency
RFI	radio frequency interference
RHNA	Regional Housing Needs Assessment
RIMS	Regional Input-Output Modeling System
RMS	root mean square
ROD	Record of Decision

ROG	reactive organic gas
RP	responsible party
RPA	Rule of Particular Applicability
RRP	restoration and revegetation plan
RSA	(Environmental) Resource Study Area
RSAC	Railroad Safety Advisory Committee
RTAC	Regional Targets Advisory Committee
RTIP	Regional Transportation Improvement Program
RTP	Regional Transportation Plan
RTPA	Regional Transportation Planning Agency
RVLP	Rural Valley Lands Plan
RWQCB	Regional Water Quality Control Board
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SANBAG	San Bernardino Association of Governments
SB	(California) Senate Bill
SBA	Small Business Administration
SBCM	San Bernardino County Museum
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SCS	Soil Conservation Service
SCS	sustainable communities strategy
SEIS	supplemental environmental impact statement
SEL	sound exposure level
SEM	scanning electron microscope
SEMS	Standardized Emergency Management System
SER	Standard Environmental Reference
SF_6	sulfur hexafluoride
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SJVR	San Joaquin Valley Railroad
SLIC	spills, leaks, investigations, and cleanup
SMAQMD	Sacramento Metropolitan Air Quality Management District
SO_2	sulfur dioxide
SOI	sphere of influence

SOP	standard operating procedure
SO_X	sulfur oxide
SPCC	spill prevention, containment, and control
SR	State Route
SSCP	Safety and Security Certification Program
SSJVIC	San Joaquin Valley Information Center
SSMP	Safety and Security Management Plan
SSP	system security plan
SSPP	system safety program plan
ST	short-term measurement
Statewide Program EIR/EIS	Final Program Environmental Impact Report and Environmental Impact Statement of the Proposed California High-Speed Train System
STB	Surface Transportation Board
STIP	State Transportation Improvement Program
STU	shovel test unit
SVE	soil-vapor extraction
SVF	South Valley Floor
SVP	Society of Vertebrate Paleontology
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
T	tesla
TAC	toxic air containment
TAG	Technical Assessment Group
TCAG	Tulare County Association of Governments
TCE	Trichloroethene
TCP	traditional cultural property
TDM	Transportation Demand Management
TEM	transmission electron microscope
TERPS	Terminal Instrument Procedure Surfaces
TGV	*Train à Grande Vitesse* (European high-speed train)
TIGER	Topologically Integrated Geographic Encoding and Referencing
TIP	Transportation Improvement Plan
TMDL	total maximum daily load
TOD	transit-oriented development
TOG	total organic gas
TPH	total petroleum hydrocarbon
TPSS	traction power substation
TPZ	Timberland Protection Zone
TRIP	Thomas Roads Improvement Program
TSA	(U.S.) Transportation Security Administration

TSMF	terminal storage and maintenance facilities
TWG	Technical Working Group
TWG	Technical Working Group
U.S. DOA	U.S. Department of Agriculture
U.S. DHS	U.S. Department of Homeland Security
U.S. DOD	U.S. Department of Defense
U.S. DOI	U.S. Department of the Interior
U.S. DOT	U.S. Department of Transportation
U.S. DOT IG	Department of Transportation Inspector General
U.S.C.	U.S. Code
UBC	Uniform Building Code
UCMP	University of California, Berkeley, Museum of Paleontology
UIC	International Union of Railways
ULSD	ultra-low sulfur diesel fuel
UPRR	Union Pacific Railroad
URBEMIS	Urban Emissions Model
URS	URS Corporation
USACE	U.S. Army Corps of Engineers
USBR	U.S. Bureau of Reclamation
USEO	U.S. (Presidential) Executive Order
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USPS	U.S. Postal Service
USSOI	U.S. Secretary of Interior
UST	underground storage tank
V/C	volume to capacity ratio (used to help define the level of service or operating condition)
V/M	volts per meter
Valley Blueprint	San Joaquin Valley Blueprint
VdB	vibration velocity level
VELB	valley elderberry longhorn beetle
VFHCP	Valley Floor Habitat Conservation Plan
VHF	very high frequency
VHS	very high speed
VMT	vehicle miles traveled
VOC	volatile organic compound
VRM	visual resource management
VSA	vibration sensitive area
WCD	Water Conservation District

WEAP	Worker Environmental Awareness Program
WiFi	wireless fidelity
WiMAX	worldwide interoperability for microwave access
WRAPP	Wetland and Riparian Area Protection Policy
WRCC	Western Regional Climate Center
WSA	water service area
WWTP	wastewater treatment plant
XPI	Extended Phase I
YOE	year-of-expenditure
µg	microgram
µT	microtesla

APPENDIX A: CALIFORNIA HIGH-SPEED RAIL AUTHORITY TECHNICAL GUIDANCE AND DATA RESOURCES

The California High-Speed Rail Authority (Authority) has prepared extensive technical guidance and data on high-speed rail design and operations, station and station area planning, environmental analysis, regulatory permitting, right-of-way acquisition, and other aspects of the high-speed rail program and projects. This table is an inventory of the guidance and data documentation as of June 2014; consult with the Authority and Program Management Team to confirm the most recent guidance and data applicable at the date of use.

Item	Guidance Title
Program	
1	TM 0.0a—Design Terms, Abbreviations, and Acronyms
2	TM 0.1—15% Design Scope
3	TM 0.1.1—Preliminary Engineering for Procurement Scope
4	TM 0.3—Basis of Design Report
5	TM 0.4—Project Development Process
6	TM 0.5—Coordination with Caltrans
7	TM 0.7—Design Submittal Protocol
8	TM 0.8—Programmatic Cost Update Methodology and Back-up
9	TM 0.9—Development of CHSTP RPA
10	TM 1.1.1—Code Design Standards and Codes of Practice
11	TM 1.1.2—Design Life
12	TM 1.1.4—Mapping and Survey Designs
13	TM 1.1.5—CADD Standards
14	TM 1.1.5.1—CHSTP Plan Prep Manual
15	TM 1.1.6—Alignment Standards for Shared Use Corridor—LA to Anaheim
16	TM 1.1.8—Proposed Methodology for Demarcation of Territorial Subdivisions and Milepost Numerics
17	TM 1.1.10—High-Speed Equipment Structure Gauge
18	TM 1.1.18—Design Variance Guidelines
19	TM 1.1.19—Cost Estimating 15% Methodology and Unit Prices
20	TM 1.1.21—Typical Cross Sections for 15% Design
21	TM 1.1.22—30% Cost Estimating Methodology
22	TM 1.1.24—Production Guide for Special Provisions
23	TM 100.01—Peer Review of UPE
24	TM 100.03—FRA Drawing Review
25	TM 100.07—Value Engineering Implementation Plan

Item	Guidance Title
26	Notice to Designer No. 1—Geotechnical Investigations for Preliminary Design
27	Notice to Designer No. 2—Guidance on Functional Station Design to Support the Environmental Documents
28	Notice to Designer No. 3—Preliminary Engineering (30% Design) Scope Revisions
29	Notice to Designer No. 4—System Facility Guidance Memo—Traction Power Supply System (TPS), communication System (COM), and Train Control (TC) related Drawings to be developed by the Regional Consultants at 30% Design Submission Level
30	Notice to Designer No. 5—Technical Support Requirements for the 408-208 Permits
31	Notice to Designer No. 6—Stand Alone Radio Sites
32	Notice to Designer No. 7—CHSTP Facilities Naming Convention
33	Notice to Designer No. 8—Geotechnical Boring and Sample Identification, Handling and Storage Guidelines
34	Notice to Designer No. 9—Radio Tower location suitability investigation via FCC's TOWAIR online tool
35	Notice to Designer No. 10—Guidance for Location of Phase Breaks
36	Notice to Designer No. 11—Guidance for Overhead Utility Clearance Requirements for OCS
Infrastructure	
37	TM 2.1.2—Alignment Design Standards for HST Operations
38	TM 2.1.3—Turnouts and Station Tracks
39	TM 2.1.7—Rolling Stock and Vehicle Intrusion Protection
40	TM 2.1.8—Turnouts and Yard Track
41	TM 2.1.9—Design Guidelines for Shared-Use Corridors
42	TM 2.2.2—Station Program Design Guidelines
43	TM 2.2.3—HST Passenger Station Site Design Guidelines
44	TM 2.2.4—Station Platform Geometric Design
45	TM 2.2.5—High-Speed Train Station Descriptions
46	TM 2.3.2—Structure Design Loads
47	TM 2.3.3—Design Guidelines for HST Aerial Structures
48	TM 2.4.2—Basic Tunnel Configuration—Twin Bore
49	TM 2.4.5—Tunnel Structural Design
50	TM 2.4.6—HST Tunnel Portal Facilities
51	TM 2.4.8—Service and Maintenance Requirements for HST Tunnels
52	TM 2.5.1—Structural Design of HSR Facilities and Buildings
53	TM 2.6.5—Hydrology and Hydraulic Design
54	TM 2.6.7—Earthwork and Track Bed Design Guidelines
55	TM 2.7.4—Utility Requirements for 15% Design Submittal
56	TM 2.7.5—Utility Requirements for 30% Design
57	TM 2.8.1—Safety and Security Requirements for Infrastructure Elements

Item	Guidance Title
58	TM 2.8.2—Control of Access and Intrusion Protection for HSR ROW and Facilities
59	TM 2.9.1—Geotechnical Investigation Guidelines
60	TM 2.9.2—Geotechnical Reports in Preparation Guidelines
61	TM 2.9.3—Geologic and Seismic Hazard Evaluation Guidelines
62	TM 2.9.6—Ground Motions for MCE, DBE, and LDBE
63	TM 2.9.10—Geotechnical Analysis and Engineering Design Criteria Guidelines
64	TM 2.10.4—Seismic Design Criteria (30% Design and Final Design)
65	TM 2.10.5—15% Seismic Design Bench Marks
66	TM 2.10.6—Fault Crossing Design Criteria and Guidance (15% and PE4P)
67	TM 2.10.10—High-Speed Train and Track Structure Compatibility
68	TM 200.01—Seismic Design and Ground Motion
69	TM 200.02—Utility Strategy
70	TM 200.07—Aesthetic Review Process for Non-Station Structures
71	Aesthetics Manual for Non-Station Structures
Systems	
72	TM 3.1.1.1—Traction Power 2x2.5kV Autotransformer Electrification System
73	TM 3.1.1.3—Traction Power Facilities
74	TM 3.1.3.1—Traction Power Simulation Initial Segment
75	TM 3.1.5.3—Utility Power Supply
76	TM 3.2.1—OCS Requirements
77	TM 3.2.2—OCS Structural Requirements
78	TM 3.2.3—Pantograph Clearances
79	TM 3.2.6—TES Grounding, Bonding and Protection from Electric Shock
80	TM 3.3.1—Automatic Train Control Concept of System
81	TM 3.3.2—Train Control Site Requirements
82	TM 3.3.3—Train Control Site Wayside Locations Power Supply Options
83	TM 3.3.4—Grounding and Bonding Requirements for Train Control and Communications
84	TM 3.4.1—Communications System Requirements
85	TM 3.4.2—Communication Site Requirements
86	TM 3.4.11—Measurement Procedures for EIR Assessment of CHSTP Alignment EMI Footprint
87	TM 300.01—TPS Interconnection to Utility
88	TM 300.02—CHSTP EMC Plan
89	TM 300.03—EMT RF Spectrum Acquisition Strategy
90	TM 300.04—ATC and Radio White Paper
91	TM 300.06—RF Propagation Simulations
92	TM 300.07—EIR/EIS Assessment of EMF

Item	Guidance Title
Maintenance	
93	TM 4.1—Los Angeles to Anaheim—Concept Level Operational Feasibility Study
94	TM 4.1.1—Two Track Station Configuration LA to Anaheim
95	TM 4.2—Train Service Plan—Phase 1
96	TM 5.1—Terminal and Heavy Maintenance Facility Guidelines
97	TM 5.3—Summary Requirements HMF, TSMF, ROW MF
98	Summary of Requirements for O&M Facilities
99	Maintenance of Infrastructure—Concept and Requirements
100	Rolling Stock Maintenance Plan
101	Concept of Operations
Rolling Stock	
102	TM 6.1—Selected Train Technologies
103	TM 6.3—Trainset Configuration Analysis and Recommendation
104	TM 600.01 —Selected Train Technologies
105	TM 600.02 —CHSTP Test Track
106	TM 600.03 —Interoperability
Regulatory Approvals	
107	TM 7.3—International Rail Standards Comparison
System Integration	
108	TM 1600.01—Verification and Validation Management Plan
109	TM 1600.02—Interface Management Plan
Environmental Evaluation	
110	Statewide Program EIR/EIS
111	Bay Area to Central Valley Program EIR/EIS
112	Independent Utility/Logical Termini of HST Sections
113	Project Level Environmental Analysis Methodology Guidelines, Version 5
114	Section 106 Programmatic Agreement for the National Historic Preservation Act
115	US Army Corps of Engineers NEPA/Section 404/Section 408 MOU
116	Common Purpose and Objectives for Project Level EIR/EIS
117	Guidance for Multi-Lingual Public Outreach
118	Scoping Guidelines for Project-Level EIR/EIS
119	Guidance for Environmental Justice
120	Title V
121	Title VI Program and Policy
122	Administrative Record Guidance
123	Comments Received After Close of Comment Period

Item	Guidance Title
124	Incorporation by Reference in EIR Documents
125	Posting of EIR/EIS Documents to the Authority and FRA Websites
126	Authority Direction regarding the notation of changes in draft and final environmental impact report/environmental impact statement (EIR/S) documents
127	Definition of the Term "Section," "Segment," "Alignment Alternative," and "Design Option" in Project-Level EIR/EIS documents
128	Authority Direction on the evaluation of slab track vs. ballast track in Project-Level EIR/EIS Documents
129	Merced to Fresno Section Central Valley Wye SEIR/SEIS Evaluation of Agricultural Lands; Response to Right-of-Way Questions
130	EIR/EIS Distribution Requirements for the Authority, FRA, EPA and the USACE
131	CHSR Environmental Re-examination Process
132	Annotated Checkpoint B Outline
133	Revised CHSR Program Implementation and Ridership Assumptions, and Project Lexicon
134	Authority Style and Branding Guide
Planning	
135	Alternatives Analysis Methods for Project Level EIR/EIS
136	Alternatives Analysis for Siting Maintenance Facilities
137	California High-Speed Rail Business Plan
138	California High-Speed Rail Authority Sustainability Policy
139	High-Speed Train Station Area Parking Guidance
140	Urban Design Guidelines
141	High-Speed Train Station Area Development: General Principles and Guidelines
142	Contributions to the High-Speed Rail Program in Reducing California's Greenhouse Gas Emission Levels
143	High-Speed Rail—Strategic Energy Plan
Right-of-Way Acquisition	
144	Interim Policy to Reference Caltrans' Right of Way Manual
Coordination	
145	Authority Direction regarding preparation for CAHSR Authority Board Meetings

APPENDIX B: ENVIRONMENTAL RESOURCE AREA DIMENSIONS

The California High-Speed Rail Authority (Authority) and Program Management Team (PMT) have developed guidance on the environmental resource study area (RSA): the area in which all environmental investigations, specific to each resource type, are conducted to determine the resource characteristics and potential impacts of the project segment. The RSA contains all of the following components:

- All facilities or features within the project footprint (PF)
- Area specific to each resource or resource issue to evaluate the intensity and determine the significance of direct and indirect impacts, permanent and temporary impacts, beneficial and adverse impacts of high-speed rail (HSR) improvements, and activities
- Areas needed to implement, operate, or maintain mitigation measures or off-site mitigation measures and mitigation sites (including relocations)
- Areas to identify and analyze potential secondary impacts of implementing mitigation

For cumulative impacts, the RSA also includes the geographic extent of each affected resource within which project impacts accumulate or interact with the impacts of other actions, including adjacent HSR sections. The study distance is measured from centerline (CL) of the HSR alignment or edge of PF, as indicated.

The PF is the area needed to construct, operate, and maintain all permanent HSR features (including tracks and guideway structures, train signaling and controls and communications facilities, traction power distribution and substations, switching and paralleling stations, passenger platforms and stations, maintenance-of-way facilities, maintenance facilities, HSR perimeter security controls, passenger station access, HSR facility operation or maintenance access, sound walls or other peripheral features owned and maintained by the Authority, freight or passenger or transit railroad grade separations, roadway grade separations and adjoining street or intersection changes, contiguous access to severed parcels, new utility features, existing utility relocations, access to new or relocated utility features, drainage facilities, any other physical changes within the area required to construct and operate HSR, and HSR property rights or licenses to accommodate HSR construction, operation, and maintenance (temporary and permanent ground or aerial fee properties, easements or licenses for HSR facility and associated feature sites, HSR operations and maintenance activities, operation or maintenance access, utility connections and maintenance, HSR stormwater and wildlife management features, construction activities, mobilization, staging and access).

The remainder property area is the area adjacent to the PF that consists of all severed or residual parcels created by the Authority's actions. These properties are not needed for HSR improvements and activities, relocations or other consequential actions, mitigation measures or mitigation sites, yet may be acquired (in fee or easement) to compensate for direct or indirect disruption of land uses, loss of usable land area, or economic utility.

The following table presents baseline dimensions for environmental and community impact investigations. Actual RSAs must consider the geographical extent of the HSR project section, physical proximity to the HSR project and associated physical changes and influence of HSR operations, and all relevant factors related to resource condition, characteristics, and physical and social contexts. An acronym key is provided following the table.

Resource or Issues	Resource Study Area Dimension			Notes
	Rural	Suburban	Urban	
Agriculture	PF+100' from CL	N/A	N/A	Study area is PF+ 100 feet from track centerline, based on federal standards for evaluating livestock noise impacts (*High-Speed Ground Transportation Noise and Vibration Impact Assessment* (FRA 2005)). Study area for indirect impacts is 25 feet beyond the PF (and adjacent remainder property areas ≤ 20 acres) and 100 feet beyond the track centerline where agricultural and forest uses are changed by HSR construction and operation. Additional study area may be needed to characterize the agricultural land context and evaluate the intensity of potential effects.
Air Quality and Greenhouse Gas Emissions	PF+1,000'	PF+1,000'	PF+1,000'	Study area for local effects shown in table. Non-localized, large-scale impacts use statewide study area. Regional-scale air pollutant effects use air basin(s) defined by AQMD of jurisdiction within HSR project section. See FB Final EIR/EIS p. 3.3-14.
Biological Resources				
Botany	PF+100'	PF+100'	PF+100'	Study area for resource issues shown in table. See FB Final EIR/EIS p. 3.7-7 for additional direction on research type and supplemental study areas. See further detail on minimum study area in the Version 5 Biological Resources and Wetlands methods.
Wetlands	PF+250'	PF+250'	PF+250'	
Wildlife	PF+1,000'	PF+1,000'	PF+1,000'	
Socioeconomics and Communities	PF+0.5 mile	PF+0.5 mile	PF+0.5 mile	Boundaries of local jurisdiction crossed by HSR project section are study area for economic effects.
Environmental Justice	PF+0.5 mile	PF+0.5 mile	PF+0.5 mile	Minimum study area for environmental justice effects shown in table.
Cultural Resources				
Architectural	§106 PA	§106 PA	§106 PA	Follow directives in NHPA Section 106 Programmatic Agreement. See FB Final EIR/EIS p. 3.17-10 and 3.17-11.
Archaeological	§106 PA	§106 PA	§106 PA	

Resource or Issues	Resource Study Area Dimension			Notes
	Rural	Suburban	Urban	
Cumulative Impacts	By resource	By resource	By resource	Study areas defined by resource and issue in collaboration with PMT, Authority, and FRA.
Geology				
General Conditions, Geologic and Seismic Hazards	PF+150' to 200'	PF+150' to 200'	PF+150' to 200'	Minimum study area for tunnel and cut-and-cover sections is 200 feet.
Resource Hazards	PF+0.5 mile	PF+0.5 mile	PF+0.5 mile	Minimum study area for proposed heavy maintenance facility or station sites is 2 miles.
Seismicity	variable	variable	variable	Study area includes regional extent of earthquake faults or dam failure inundation.
Paleontological Resources	PF+150'	PF+150'	PF+150'	In addition to the ground surface area, the study area includes vertical dimension of all geological units beneath the horizontal RSA that may be encountered by project construction or operation.
Hydrology and Water Resources	variable	variable	variable	Study area extends from PF to extent of affected surface and ground water resources or FEMA-designated flood hazard areas affected by project. See FB Final EIR/EIS p. 3.8-15.
Land Use, Station Planning, and Development	PF+0.5 mile	PF+0.5 mile	PF+0.5 mile	Additional study area may be needed to evaluate indirect effects.
Public Utilities and Energy				
Public Utility Conflicts	PF	PF	PF	See FB Final EIR/EIS p. 3.6-16. Minimum study area includes area affected by utility relocations, extensions, or expansions to construct or serve HSR.
Power Generation and Transmission	statewide	statewide	statewide	
Aesthetics and Visual Resources	CL+0.5 mile	CL+ 0.25 mile	CL+ 0.25 mile	
Hazardous Materials and Wastes				
Hazardous Materials and Waste Exposure	PF+150'	PF+150'	PF+150'	Potential environmental concern site database search uses a 1-mile study area on either side of the alternative alignment centerlines and from the center of alternative station or heavy maintenance facility sites. Refer to ASTM database-search standard practice.
Landfill and Landfill Gas Exposure	PF+ 0.25 mile	PF+ 0.25 mile	PF+ 0.25 mile	
School Impacts	PF+ 0.25 mile	PF+ 0.25 mile	PF+ 0.25 mile	

Resource or Issues	Resource Study Area Dimension			Notes
	Rural	Suburban	Urban	
Noise and Vibration				
Noise	CL+2,500'	CL+2,500'	CL+2,500'	Follow FRA Noise and Vibration Impact Assessment guidance (September 2012). See FB Final EIR/EIS p. 3.4-16 to 3.4-18 for detailed screening distances.
Vibration	PF+275'	PF+275'	PF+275'	
Transportation	variable	variable	variable	Primary study area includes intersections and roadways surrounding station and HMF sites. Variation in PF and local conditions requires collaboration with local agencies, Authority, FRA, and PMT to define study area. See FB Final EIR/EIS p. 3.2-11.
Sections 4(f) and 6(f)				
Parks, Recreation, Open Space, Refuges	PF+1,000' or 0.5 mile	PF+1,000' or 0.5 mile	PF+1,000' or 0.5 mile	Study area dimensions are for HSR alignments (PF+1,000') or HMF, station and support facility sites (PF+0.5 mile). See FB Final EIR/EIS p. 4-3. Exception: where resources are separated from the HSR project element by an existing transportation corridor, the study area is bounded by the outer transportation right-of-way.
Historic Sites	§106 PA	§106 PA	§106 PA	Follow directives in NHPA Section 106 Programmatic Agreement for Historic Properties. See FB Final EIR/EIS p. 4-3.
EMF				
HSR Alignment, TPSS Transmission Lines	CL+200'	CL+200'	CL+200'	
HMF Sites	PF+200'	PF+200'	PF+200'	
RFI				
HSR Alignment	CL+500'	CL+500'	CL+500'	
HMF Sites	PF+500'	PF+500'	PF+500'	
Parks, Recreation, and Open Space	PF+1,000' or 0.5 mile	PF+1,000' or 0.5 mile	PF+1,000' or 0.5 mile	See note for Section 4(f) and 6(f). On-street bicycle routes, unless identified as recreational facilities by jurisdictions, are not included in this study area. Similarly, Class 2 Bike Lanes are transportation facilities.
Regional Growth	Incorporated cities/towns and unincorporated counties			

Resource or Issues	Resource Study Area Dimension			Notes
	Rural	Suburban	Urban	
Safety and Security				
Direct Effects	PF+0.5 mile	PF+0.5 mile	PF+0.5 mile	Minimum study area for direct effects along HSR alignment and ancillary facilities, maintenance facilities, and station sites.
Indirect Effects	PF+service boundary	PF+service boundary	PF+service boundary	Study area for indirect effects is the PF+boundary of service area for PF or within 2 miles of the PF for services responding to HSR incidents.

Acronym Key

AQMD	Air Quality Management District
ASTM	American Society for Testing and Materials
CL	centerline
EIR/EIS	environmental impact report/environmental impact statement
EMF	electromagnetic frequency
FB	Fresno to Bakersfield High-Speed Rail Section
FEMA	Federal Emergency Management Agency
FRA	Federal Railroad Administration
HMF	heavy maintenance facility
HSR	high-speed rail
NHPA	National Historic Preservation Act
PA	Programmatic Agreement
PF	project footprint
PMT	Program Management Team
RFI	radio frequency interference
RSA	resource study area
TPSS	traction power substation

APPENDIX C: CULTURAL RESOURCES TECHNICAL MATERIALS

The methodology used to evaluate cultural resources impacts is generally based on the *Programmatic Agreement among the Federal Railroad Administration, The Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California High-Speed Rail Authority regarding Compliance with Section 106 of the National Historic Preservation Act, as it pertains to the California High-Speed Rail Project* and the methodology for Chapter 3, Section 3.17, Cultural Resources. Methods include the steps necessary to develop affected environment sections, including conducting background literature and record searches, field surveys, and consultations with the Native American community and other interested parties. Methods to assess impacts are also described. Steps needed to coordinate California Environmental Quality Act and National Environmental Policy Act compliance with Section 106 procedures are also described.

This appendix provides additional information relevant to conducting cultural resource impact analysis and preparing EIR/EIS documents: technical memoranda with further task-specific guidance and an annotated outline for the EIR/EIS Chapter 3, Section 3.17, Cultural Resources.

See Appendix A for other technical guidance by the California High-Speed Rail Authority.

Cultural Resources Technical Guidance Memorandum	Publication Date	Date Appended to EIR/EIS Methods
#1—Setting the Area of Potential Effect Relative to Existing Rail Facilities	March 26, 2013	June 2014
#2—Early Identification of Cultural Resources as Project Constraints	April 24, 2013	June 2014
#3—Documentation for "CEQA-Only" Cultural Resources	June 20, 2013	June 2014
#4—Section 4(f) and the Importance of Properly Defining Historic Property Boundaries	June 4, 2013	June 2014
#5—CEQA/NEPA Compliance for Properties Exempted Under Section 106	July 10, 2013	June 2014
Chapter 3 Section 3.17 Annotated Outline	TBD	TBD

CALIFORNIA
High-Speed Rail Authority

Cultural Resources Technical Guidance Memorandum #1:

Setting the Area of Potential Effect Relative to Existing Rail Facilities

Delineation of the Area of Potential Effects (APE) for the High-Speed Train (HST) Project is addressed in Attachment B of the Section 106 Programmatic Agreement (PA) for the High-Speed Train (HST) Project (as executed in 2011). Attachment B to the PA includes a substantial amount of guidance regarding the definition of the APE where the "undertakings involve the construction of high-speed rail alongside existing railroads." The guidance suggests that introduction of a high-speed rail line in the same corridor as an existing rail line has little potential to cause alterations in the character or use of historic properties that may be in the vicinity, and thus the APE can be reduced in size in these areas. The guidance then provides some considerations for scenarios where such reductions in the APE would not be appropriate.

Overall, this appendix presents a creative, useful, and very defensible approach to a customized APE for the HST project. Unfortunately, it requires intensive study and deliberation to fully understand and apply these concepts, which has led to a range of interpretations. Here is another way of saying the same things.

When defining the APE where the proposed HST alignment or improvements would occur in an existing rail corridor or facility, the APE can be drawn as the proposed HST right of way EXCEPT when the following is true:

- The historic railroad service (typically freight) would be put out of service, destroyed, physically altered, or moved as a result of project activities.
- Features that were critical to the function (either freight or passenger) of the historic rail system would be removed.
- Proposed features of the new HST would create a physical/visual barrier and thus would effectively disassociate historic properties that are significant for their association with the existing rail line.
- A proposed new elevated or sizable feature of the HST would impair the integrity of setting of an historic property, if setting is a critical component of that property's significance.
- The noise levels of the HST would be notably greater than the historic rail operations, and there is an historic property whose integrity would be impaired by such changes.

Approved by: ______________________ Date: March 26, 2013

John Sharp, MA, RPA
Senior Environmental Planner
High-Speed Rail Authority

Note: This guidance was authored by Susan Lassell and Mark Bowen, and was developed as a result of a series of cultural resources working-group meetings in January through March of 2013. Working-group participants included cultural resources staff from HSRA/PMT and from the Regional Consultants for the Merced to Fresno, Fresno to Bakersfield, Bakersfield to Palmdale, and San Jose to Merced Sections of the HST System.

CALIFORNIA
High-Speed Rail Authority

Cultural Resources Technical Guidance Memorandum #2:

Early Identification of Cultural Resources as Project Constraints

This memorandum supplements the cultural resources identification and evaluation guidance in the Section 106 Programmatic Agreement (PA) for the High-Speed Train (HST) Project (as executed in 2011).

Statement of Problem

Effects to cultural resources that are eligible for listing in the National Register of Historic Places (NRHP) have the potential to result in:

- a "Finding of Adverse Effect" under Section 106 of the National Historic Preservation Act of 1966 (Section 106);
- a finding of "significant impact" under the National Environmental Policy Act of 1969 (NEPA); and
- a determination of "use" under Section 4(f) of the Department of Transportation Act of 1966 (Section 4(f)).

Additionally, impacts to cultural resources that are eligible for listing in the California Register of Historic Resources (CRHR) or otherwise meet the CEQA definition of "historical resource"[1] have the potential to result in:

- a determination of "significant impact" under the California Environmental Quality Act of 1970 (CEQA).

Any of these four findings/determinations typically require the identification of methods to minimize or mitigate effects/impacts to such resources, or to avoid them entirely, if possible. This can impact the timeline for project approval, as well as project costs, due either to the late development of design alternatives that avoid or minimize effects to such resources, or the development and implementation of mitigation measures. Early avoidance of potential adverse effects to such resources, if possible and practical, is therefore desirable not only in terms of protecting the resources themselves, but also reducing project costs and shortening project approval timelines. The purpose of this guidance is to formally direct HST cultural resources staff to identify these resources and elevate them to the attention of HST planning and design staff as early as possible in the planning and design process.

Guidance

All staff conducting cultural resource studies for the HST Project, including "Regional Consultant" (RC) staff, should prioritize the identification and evaluation of cultural resources that meet the following two criteria:

(1) are eligible, or appear to be eligible for listing in the NRHP or CRHR, or are already listed in a qualified local register[1]; and

(2) are in a location that clearly has the potential to result in a finding of "Adverse Effect" under Section 106, a finding of "Significant Impact" under NEPA, a determination of "use" under Section 4(f), or a determination of "significant impact" under CEQA .

Cultural resources staff should also bring these resources to the attention of HST/PMT/RC project management staff, including design staff, planning staff, and HSRA/PMT cultural resources staff.

To implement this process of early identification, RC cultural resources staff for each Section/Segment of the HST System should create and maintain a matrix/database listing all cultural resources that meet the two criteria listed above. The purpose of the matrix/database is to provide summary information in one location that can be easily shared with other HST Project staff to facilitate more effective planning and more efficient compliance with Section 106, NEPA, Section 4(f), and CEQA.

This matrix/database should be entitled "Preliminary Cultural Resources Project Constraints Matrix", and should include the following classes of information:

(1) name of resource (if it has a common name);
(2) brief description of resource;
(3) locational information, including APN # and/or street address and/or engineering station number (note: precise locational information should not be included for Native American archaeological sites in order to protect them from unauthorized artifact collection);
(4) specific project element potentially affecting the resource (e.g., rail alignment, roadway structure, etc.);
(5) confirmation of whether or not resource is located at a proposed location of an HST passenger station;
(6) statement identifying spatial relationship between resource and potential project impacts (such as distance, if applicable);
(7) city or vicinity;
(8) county;
(9) owner type (e.g., private, federal, state, city, utility, etc.);
(10) year built, if known;
(11) NRHP status code (if known), and California Office of Historic Preservation (OHP) status code (if known).

Approved by: [signature] Date: April 24, 2013

John Sharp, MA, RPA
Senior Environmental Planner
High-Speed Rail Authority

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[1] CEQA historical resources are those listed in, or determined eligible for listing in, the CRHR; included in a local register of historical resources that meets certain standards; or determined historically significant by a lead agency as supported by substantial evidence in light of the whole record (CCR Title 14, Section 15064.5 [a]).

Note: This guidance was developed as a result of a series of cultural resources working-group meetings in January through April of 2013. Working-group participants included cultural resources staff from HSRA/PMT and from the Regional Consultants for the Merced to Fresno, Fresno to Bakersfield, Bakersfield to Palmdale, and San Jose to Merced Sections of the HST System.

Preliminary Cultural Resources Project Constraints

SAMPLE ONLY - NOT A WORKING PROJECT FILE

Authors/Contacts: 1) Meta Bunse, Built Environment, 530-757-2521; 2) --- ----------------, Archaeology, -----------------

SITE DESCRIPTION		SITE LOCATION					HISTORIC STATUS				HST INFORMATION			
Site/Resource_Name	**Site Description/Comments**	**I.D.** (APN, engr. station, bridge #, etc.)	**Street #**	**Street Name**	**Location, City**	**Location, County**	**Year Built**	**Owner type**	**OHP Historic Status**	**Previous Historic Status**	**Project subsection, feature, or activity**	**In/near HST Station?**	**In HST Footprint?**	**Approximate Distance to HST Footprint**
National Chavez Center at Nuestra Señora Reina de La Paz	National Chavez Center at Nuestra Señora Reina de La Paz	50508014	29700	WOODFORD TEHACHAPI	KEENE	KERN	1914-2003	Private	1S	1; NRHP; NHL; National Monument	Although Visual (indirect) effect is possible, a "No Adverse" effect is likely finding as long as project remains on east side of existing rail. TE-2 (Tehachapi Near Grade North option).	no	no	September footprint revision farther from historic property. Exisiting freight rail between property boundary and project footprint. Need to confirm historic property boundary - might include additional parcels but nomination doesn't say.
Kern No. 1 Transmission line	Transmission Line running on west side of Tower Line Road; some towers in public ROW, some on private parcels; other bldgs on -05 that are outside of APE "Kern River No. 1 Gorman"	17722005; 17722008	n/a	Tower Line Road	vicinity of Edison	KERN	1907	Corp. Utility	3S		Adverse effects from ES-1 (Edison South At Grade). Looks avoidableif design refinements take into account that T-line towers extend north and south on Tower Line Road. Large footprint for HST and grade separation at Tower Line Rd also includes TPS structure.	no	yes	0 feet. Linear T-line that intersects with both Edison subsection alignments. T-Line is adjacent & parallel to Towerline Road.
Kern No. 1 Transmission line	Transmission Line running on west side of Tower Line Road; some towers in public ROW, some on private parcels "Kern River No. 1 Gorman"	17722005; 17722008	n/a	Tower Line Road	vicinity of Edison	KERN	1907	Corp. Utility	3S		Adverse effects from ES-1 (Edison South At Grade). Looks avoidable. Large footprint for HST and grade separation at Tower Line Rd. Also, TPS likely.	no	yes	0 feet. Linear T-line that intersects with both Edison subsection alignments. T-Line is adjacent & parallel to Towerline Road.
Los Angeles Aqueduct	added 4/24/12; LA Aqueduct assumed eligible; eligibility status pending response from URS Pasadena	23719216	n/a	Aquaduct Road	vicinity of Mojave	KERN	1908-1913	Govt., Municipal	2S2		Adverse effects from MO-1 (Mojave At-Grade). Avoidable as long as HST spans both the aquaduct and its parallel access road. HST and aquaduct intersect at oblique angle.	no	yes	0 feet. Linear aquaduct (mostly buried, top visible) that intersects the project at a southwest-northeast angle through a windfarm.
Los Angeles Aqueduct	added 4/24/12; LA Aqueduct assumed eligible; eligibility status pending response from URS Pasadena	23704301	n/a	Aquaduct Road	vicinity of Mojave	KERN	1908-1913	Govt., Municipal	2S2		Adverse effects from MO-1 (Mojave At-Grade). Avoidable as long as HST spans both the aquaduct and its parallel access road. HST and aquaduct intersect at oblique angle.	no	yes	0 feet. Linear aquaduct (mostly buried, top visible) that intersects the project at a southwest-northeast angle through a windfarm.
Great Lakes Carbon Corp	off Patterson Road; Delta Liquid Energy; streamline if research collected finds alteration; tank has _RESCE___ _ARBON Corp; - Great Lakes Carbon Corp.	47302317	1050	Sierra Hwy	ROSAMOND	KERN		Private	3S/3CS		Adverse effects from access road for all 4 alts? AE-1, AE-2, AW-1, and AW-2? Effects are from Patterson Road grade separation structure. Convo with engineers in October 2012 indicate that design refinements may be able to avoid most property takes, but this was not fully resolved.	no	yes	0 feet. Patterson Rd structure is property take along south side of parcel: AE-2 footprint is about 120 from parcel boundary. Exisiting freight rail between property boundary and project footprint.
Corner building	aka 500-510 W. Lancaster; Evaluated as part of a district that is not eligible for NRHP/CRHR - bldgs not evaluated individually so it will be reevaluated by us for this project	3134013010	44851	Sierra Hwy	LANCASTER	LOS ANGEL	1936	Private	6L	6L (local planning district). District is not NRHP eligible, but may be CEQA only.	Possible direct effect. Impacted by all AV-W and AV-E because of roadway structure? Design refinements influx in this area, potential effects not known.	no	no?	0 feet. Property take? Or immediately adjacent to grade separation struction for Lancaster Boulevard. If access permantently affected will project aquire?
Hotel/Museum	557 Lancaster blvd; evaluated as part of a district that is not eligible for NRHP/CRHR - bldgs not evaluated individually so require eval for this project	3134011912	557	W. Lancaster	LANCASTER	LOS ANGEL	unk	Private	3s?		Possible direct effect. Impacted by all AV-W and AV-E because of roadway structure? Design refinements influx in this area, potential effects not known.	no	yes	0 feet. Property take? Or immediately adjacent to grade separation struction for Lancaster Boulevard. If access permantently affected will project aquire?
Post Office	Post Office is likely subject to Multiple Property Listing by NPS, assumed eligible for listing.	3134011912	567	W. Lancaster	LANCASTER	LOS ANGEL	unk	Govt., Municipal	3s?		Possible direct effect. Impacted by all AV-W and AV-E because of roadway structure? Design refinements influx in this area, potential effects not known.	no	yes	0 feet. Property take? Or immediately adjacent to grade separation struction for Lancaster Boulevard. If access permantently affected will project aquire?

former Bank	evaluated as part of a district that is not eligible for NRHP/CRHR - bldgs not evaluated individually so it will be reevaluated by us for this project	3134013020	512	W. Lancaster	LANCASTER	LOS ANGEL	1913c	Private	6L	6L (local planning district). District is not NRHP eligible, but may be CEQA only.	Possible direct effect. Impacted by all AV-W and AV-E because of roadway structure? Design refinements influx in this area, potential effects not known.	no	no?	0 feet. Property take? Or immediately adjacent to grade separation struction for Lancaster Boulevard. If access permantently affected will project aquire?
Village Grille (Diner)	Architects: Armet and Davis; The Village Grille	3132010018	44303	Sierra Hwy	LANCASTER	LOS ANGEL	1960	Private	3S		Direct Adverse effect from AW-1 (Antelope Valley West - At Grade)	no	yes	0 feet. In construction foot print of AW-1 and overpass of W. Avenue J; about 80 feet from parcel to AE-1.

CALIFORNIA High-Speed Rail Authority

Cultural Resources Technical Guidance Memorandum #3

Documentation for "CEQA–Only" Cultural Resources

This memorandum supplements the cultural resources identification and evaluation guidance in the Section 106 Programmatic Agreement (PA) for the High-Speed Train (HST) Project (as executed in 2011).

Statement of Problem

The term "CEQA-only cultural resources" refers to cultural resources that qualify as "historical resources" for the purpose of the California Environmental Quality Act (CEQA)[1], but do not qualify as "historic properties" for the purpose of Section 106 of the National Historic Preservation Act (Section 106)[2]. The California High-Speed Rail Authority (CHSRA) is responsible for complying with both NEPA/CEQA and Section 106, and for legal and practical reasons has sought to integrate these processes, which has included consolidating the cultural resources findings generated by these processes into one set of technical documents that support both processes. The problem is that the Section 106 PA for the HST Project can only address the Section 106 process, and by default cannot provide direction on how to manage and treat those cultural resources which are not eligible for listing on the NRHP, but qualify as historical resources for the purpose of CEQA. The purpose of this memorandum is therefore to identify the specific methods by which these "CEQA-only" cultural resources will be addressed within the integrated analysis (NEPA/CEQA and Section 106) implemented on the HST Project.

Guidance

Technical reports prepared in support of specific sections of NEPA/CEQA environmental documents and in compliance with Section 106 (as governed by the PA) should include discussions of all resources that:

(1) qualify as historical resources for the purpose of CEQA[3]; or
(2) qualify as historic or cultural resources for the purpose of NEPA[4]; or
(3) qualify as historic properties for the purpose of Section 106[5].

In support of this objective, Regional Consultant (RC) cultural resources staff should identify all cultural resources that meet the three criteria listed above and address them in HST cultural resources studies and documents as follows:

- **Historic Property Survey Reports (HPSRs)** should address and include summary tables of all historic properties and historical resources;
- **Historic Architectural Survey Reports (HASRs)** should address all built environment resources in detail, including both historic properties and historical resources;

- **Archaeological Survey Reports (ASRs)** should address all archaeological resources in detail, including both historic properties and historical resources[6];
- **Finding of Effects (FOE)** should include separate sections for discussions of adverse effects under Section 106, impacts to historic/cultural resources under NEPA, and impacts under CEQA that cause (or have the potential to cause) substantial adverse change to historical resources;
- **Memoranda of Agreement (MOAs)** stipulate the resolution of adverse effects to historic properties under Section 106, and should NOT include discussion of CEQA-only cultural resources; however
- **Treatment Plans (TPs)** should address all historic properties that are adversely affected, and should address all historical resources for which the project will cause a substantial adverse change, with separate sections for those resources that are only being addressed under CEQA.

In addition, because the Section 106 PA does not address "CEQA-only" cultural resources:

- discussions of CEQA-only cultural resources should be clearly delineated within the Section 106 documents listed above; and
- formal correspondence with SHPO should explicitly direct the SHPO to disregard the CEQA-related sections of the Section 106 documents listed above.

Finally, the guidance above does not preclude or replace standard CEQA compliance practices:

- impacts to CEQA-only cultural resources should be addressed in the **EIR/EIS (Environmental Impact Report/Environmental Impact Statement)**; and
- mitigation for CEQA-only cultural resources should be addressed in the **Mitigation Monitoring and Reporting Plan (MMRP)**.

Approved by: ______________ Date: 6/20/13 Approved by: ______________ Date: 6/20/13

John Sharp, MA, RPA
Senior Environmental Planner
High-Speed Rail Authority

Sarah Allred
Senior Environmental Planner
High-Speed Rail Authority

[1,3] CEQA "historical resources" are resources listed in, or determined eligible for listing in, the California Register of Historical Resources; included in a local register of historical resources that meets certain standards; or determined historically significant by a lead agency as supported by substantial evidence in light of the whole record (CCR Title 14, Section 15064.5 [a]).

[2,5] Section 106 "historic properties" include any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places (NRHP). [36 C.F.R. § 800.16.(l)(1)] Properties of religious and cultural significance to Indian tribes and Native Hawaiian organizations may be determined to be eligible for inclusion in the NRHP. [16 U.S.C. 470a(d)(6)(A)]

[4] The affected human environment reviewed under NEPA includes aesthetic, historic, and cultural resources, as these terms are commonly understood, including such resources as sacred sites. This means that historic or cultural resources that are not properties under Section 106 may conceivably be considered as part of the NEPA review. In practice, however, the Section 106 criteria for historic properties are typically used to identify the historic and cultural resources to be considered under NEPA.

[6] Archaeological resources that qualify as historical resources under CEQA but not as historic properties under Section 106 would be highly unusual, but not impossible.

Note: This guidance was developed as a result of a series of cultural resources working-group meetings in January through June of 2013. Working-group participants included cultural resources staff from HSRA/PMT and from the Regional Consultants for the Merced to Fresno, Fresno to Bakersfield, Bakersfield to Palmdale, and San Jose to Merced Sections of the HST System.

CALIFORNIA
High-Speed Rail Authority

Cultural Resources Technical Guidance Memorandum #4:

Section 4(f) and the Importance of Properly Defining Historic Property Boundaries

Statement of Problem

Section 4(f) of the Transportation Act of 1966 applies to any project that permanently incorporates land of an historic site, regardless of an agency's finding of effect under Section 106 of the National Historic Preservation Act of 1966 (see 23 U.S.C. § 138(a) and 49 U.S.C. § 303(a)). For purposes of Section 4(f), the phrase "historic site" is understood to have the same meaning as "historic property" (i.e., a resource that is listed in or determined eligible for listing in the National Register of Historic Places) under Section 106 (FHWA 2012, p. 27). This means Section 106 studies can inadvertently trigger unnecessary analysis under Section 4(f) in cases where the boundary of an historic property has unintentionally been defined as being larger than appropriate during Section 106 identification and evaluation studies. The purpose of this guidance is to help ensure that High–Speed Rail (HSR) cultural resources staff defines the boundaries of historic properties in a manner that supports appropriate Section 4(f) analysis, while still ensuring compliance with Section 106 of the National Historic Preservation Act.

Discussion and Guidance

Establishing appropriate and legally justifiable boundaries for an historic property is a necessary step in determining whether properties will be affected under Section 106. As discussed above, this process of boundary definition can at times also play a key role in deciding whether subsequent analysis is required under Section 4(f). Under the terms of the programmatic agreement governing Section 106 compliance for the HSR Project, the California High Speed Rail Authority (Authority) is responsible for identifying, documenting, and evaluating historic properties, which includes defining their boundaries.

The process of delineating historic property boundaries is typically completed during the Section 106 inventory and evaluation process, and should be documented on the resource's Department of Parks and Recreation ("DPR") form. Determination of historic property boundaries should be based on the nature of the property's historic/cultural significance, historic/cultural integrity, setting and landscape features, functions, and research value. These elements will vary widely for different property types (e.g., objects, structures, buildings, sites, districts, and historic or cultural landscapes). Comprehensive guidance on this subject is detailed in *National Park Service Bulletin 21: Defining Boundaries for National Register Properties* (NPS 1997). In practice, most boundary determinations will take into account the extant legal boundaries, historic boundaries (identified in tax maps, deeds, or plats), natural features, cultural features, and/or the distribution of cultural resources as identified by survey and/or testing for subsurface resources. Legal property boundaries can coincide with the boundaries of identified historic properties, but not necessarily. Therefore, definition of historic property boundaries should always be individually

reviewed for appropriateness and reasonableness. Identification of lands surrounding an identified historic property that retain historic integrity and contribute to eligibility of the resource should be clearly defined and justified in inventory/eligibility documentation (NPS 1997).

HSR cultural resources staff, including Project Management Team (PMT) staff and Regional Consultant (RC) staff, is directed to:

(1) follow the guidance in NPS Bulletin 21 in defining the boundaries of historic properties or potential historic properties; and
(2) ensure that boundaries are defined to include only those features and land areas that contribute to the eligibility or potential eligibility of the resource being evaluated.

Approved by: ________________ Date: 6/4/13

John Sharp, MA, RPA
Senior Environmental Planner
High-Speed Rail Authority

Approved by: ________________ Date: 6/4/13

Sarah Allred
Senior Environmental Planner
High-Speed Rail Authority

Sources Cited

FHWA Section 4(f) Policy Paper. Washinton, D.C.: Office of Planning, Environment, and Realty, Federal Highway Administration, U.S. Department of Transportation, July 20, 2012.

National Register Bulletin 21: Defining Boundaries for National Register Properties. Washington, D.C.: National Park Service, U.S. Department of the Interior, 1997.

Note: This guidance was developed as a result of a series of cultural resources working-group meetings in January through June of 2013. Working-group participants included cultural resources staff from HSRA/PMT and from the Regional Consultants for the Merced to Fresno, Fresno to Bakersfield, Bakersfield to Palmdale, and San Jose to Merced Sections of the HST System.

CALIFORNIA
High-Speed Rail Authority

Cultural Resources Technical Guidance Memorandum # 5

CEQA/NEPA Compliance for Properties Exempted Under Section 106

This memorandum supplements the cultural resources identification and evaluation guidance in the Section 106 Programmatic Agreement (PA) for the High-Speed Train (HST) Project (as executed in 2011).

Statement of Problem

Attachment D to the Section 106 PA for the HST Project exempts certain types of archaeological and built environment resources from being formally evaluated, and defines the identification and evaluation process for other classes of resources which do not qualify as an "historic property" under Section 106 of the National Historic Preservation Act (NHPA).[1] However, there has been some confusion regarding how to address these exempted resources in the context of the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). This memorandum provides guidance regarding the limitations of the Section 106 PA, and directs HST cultural resources staff to ensure that resources exempted under the Section 106 PA are adequately addressed in relation to the separate compliance requirements of CEQA and NEPA.

Discussion

The exemptions outlined in the PA apply only to the Section 106 compliance process and cannot be used to "exempt" resources from evaluation under CEQA and NEPA. This is because federal agencies have statutory obligations under NEPA and NHPA, and state agencies have a separate responsibility to comply with CEQA. CEQA requires consideration of "historical resources", a term which can be more inclusive than "historic property" as defined under Section 106.[2] NEPA requires consideration of "historic and cultural resources," a term which can similarly include a wider range of resources than the criteria for an "historic property".[3]

Section 106, CEQA, and NEPA also define impacts differently. Section 106 refers to "adverse effects", which are found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the property's integrity. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative. Under CEQA, state agencies must determine whether projects have a "significant effect" on the environment, including a "substantial adverse change" to an historical resource. Finally, a "significant impact" to a cultural resource under NEPA is determined based on context and intensity. Impacts are analyzed in several contexts such as society as a whole, the affected region, the affected interests, and the locality. Intensity refers to the severity of effect, which includes factors such as the magnitude, geographic extent, duration, and frequency of the effect.

In practice, most of the resource types outlined in the PA as exempt from further consideration under Section 106 would also not qualify as historical resources under CEQA, or as historic or cultural resources under NEPA, for similar reasons (e.g., not old enough, lack of integrity, etc.). But because each of these different regulatory requirements has slightly different criteria, HST cultural resources staff need to ensure that CEQA and NEPA requirements are met by confirming that properties exempted using the Section 106 PA also do not meet the criteria for an historical resource under CEQA, or the criteria for a cultural or historical resource under NEPA. (For example, a resource that has been identified as eligible for a qualifying local register cannot be "exempted" using the PA, and its historical resource status under CEQA will need to be determined separately using CEQA criteria).

<u>Guidance</u>

For the purposes of ensuring adequate CEQA and NEPA compliance, HST cultural resources staff is directed as follows in regards to addressing resources exempted from formal evaluation under the Section 106 PA:

(1) Do not use the term "exempt" to explain why any cultural resources are not "historical resources" under CEQA, or are not "historic or cultural resources" under NEPA.

(2) Cultural resources inventory and evaluation studies should include a statement explicitly stating that: (a) the studies were conducted pursuant to the requirements of Section 106, CEQA, and NEPA; and (b) resources exempted under the Section 106 PA were also considered under CEQA and NEPA. Suggested language for this statement is as follows (in italics):

> *Studies of historic-period built environment resources took into account all possible historic architectural property types, including buildings, structures, objects, districts, sites, and historic landscapes. Pursuant to the requirements of Section 106 (as governed by the PA), and CEQA and NEPA, these property types were identified and evaluated for their potential eligibility for listing in the National Register of Historic, and for their potential to be historical resources under CEQA or historic or cultural resources under NEPA. Resources exempted by the PA from formal evaluation under Section 106 were also considered for their potential to be historical resources under CEQA and/or historic or cultural resources under NEPA, and required no further study.*

(3) The occasional resource which is not eligible for NRHP listing but still meets the criteria for an "historical resource" under CEQA and/or an "historic or cultural resource" under NEPA (i.e., a "CEQA-only" resource) should not be exempted under the Section 106 PA, and should be addressed as outlined in *Cultural Resources Technical Guidance Memorandum #3": Documentation for "CEQA-Only" Cultural Resources.*

Approved by: [signature] Date: 7/10/13

John Sharp, MA, RPA
Senior Environmental Planner
High-Speed Rail Authority

Approved by: [signature] Date: 7/10/13

Sarah Allred
Senior Environmental Planner
High-Speed Rail Authority

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[1] Section 106 "historic properties" include any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places (NRHP). [36 C.F.R. § 800.16.(l)(1)] Properties of religious and cultural significance to Indian tribes and Native Hawaiian organizations may be determined to be eligible for inclusion in the NRHP. [16 U.S.C. 470a(d)(6)(A)]

[2] CEQA "historical resources" are resources listed in, or determined eligible for listing in, the California Register of Historical Resources; included in a local register of historical resources that meets certain standards; or determined historically significant by a lead agency as supported by substantial evidence in light of the whole record (CCR Title 14, Section 15064.5 [a]).

[3] The affected human environment reviewed under NEPA includes aesthetic, historic, and cultural resources, as these terms are commonly understood, including such resources as sacred sites. This means that historic or cultural resources that are not historic properties under Section 106 (i.e., included or eligible for inclusion in the NRHP) may conceivably be considered as part of the NEPA review. In practice, however, the Section 106 criteria for historic properties are typically used to identify the historic and cultural resources to be considered under NEPA.

Note: This guidance was developed as a result of a series of cultural resources working-group meetings in January through June of 2013. Working-group participants included cultural resources staff from HSRA/PMT and from the Regional Consultants for the Merced to Fresno, Fresno to Bakersfield, Bakersfield to Palmdale, and San Jose to Merced Sections of the HST System.

MEMORANDUM 6 NOT DISTRIBUTED, 4-13-2017

CALIFORNIA High-Speed Rail Authority

Cultural Resources Technical Guidance Memorandum #7

Integrity Considerations for Streamlining Built-Environment Resources per PA Attachment C

Revised 6/7/2016

This memorandum supplements the cultural resources identification and evaluation guidance in the Section 106 Programmatic Agreement (PA) for the High-Speed Rail (HSR) Project (as executed in 2011). It is intended to guide and assist the Regional Consultant (RC) staff tasked with identifying and evaluating cultural resources on behalf of the High-Speed Rail Authority (Authority) and the Rail Delivery Partner (RDP).

In particular, the Authority and the RDP are providing this additional guidance to clarify when it is appropriate to document resources using the streamlined documentation format as outlined in Attachment C of the PA for properties that have incurred alterations, as opposed to conducting intensive surveys and documenting resources using the full set of California Department of Parks and Recreation (DPR) 523 forms.

Statement of Problem

While Attachment C of the PA provides a general format for streamlining the documentation of "substantially altered" properties that are 50 years of age or older, it does not define what a "substantially altered" property is or indicate when alterations to buildings and structures are "substantial" enough to merit streamlined documentation. The result of this minimal guidance has resulted in inconsistent approaches to determining when alterations are significant enough to make the property "screenable."

Background

The PA states that a property should be evaluated only if a Qualified Investigator (QI) reasonably determines that the property has a demonstrable potential for historic significance (Attachment D). Evidence of such potential consists of association with significant historic events or individuals under National Register of Historic Places (NRHP) Criterion A or B; engineering, artistic, design, or aesthetic values (NRHP Criterion C); information value (NRHP Criterion D); the presence of community concerns; or inclusion as a potential contributing element within a larger property requiring evaluation, such as a historic or cultural landscape, traditional cultural property, or historic district. Attachment D of the PA defines categories of properties that are typically not streamlined or evaluated, unless deemed otherwise in the professional judgment of a QI. One of the initial steps in determining when a property can be "streamlined" involves reviewing the list of property types considered exempt from evaluation under Attachment D of the PA.

Property types within the study area that cannot be exempted from evaluation per Attachment D of the PA should be adequately described (with character-defining features) in the Historic Context chapter of the HASR. This discussion can inform the case-by-case decision of whether to evaluate properties through the streamlined documentation format or by using a full set of DPR forms. In addition to including property types in the Historic Context chapter, the Summary of Identification Efforts and Methods chapter should include a discussion on the approach taken in streamlining the property types found in the subject HSR section.

If the property under consideration cannot be exempted from evaluation per Attachment D of the PA, proceed with assessing the significance and integrity of the property. "Integrity" in this context is the authenticity of a property's historic identity, as evidenced by the survival of physical characteristics that existed during the property's potential period of significance. There are seven specific ways that the quality of integrity applies to properties that are evaluated for the NRHP and the California Register of Historical Resources (CRHR): location, design, setting, materials, workmanship, feeling, and association.

GUIDANCE

Documentation on DPR 523 Forms

If a property retains the relevant physical characteristics that it possessed in the past, then it has the capacity to convey its association with historical events, patterns, persons, architectural or engineering design and technology, or information about a culture or peoples. Properties that the QI reasonably determines to possess demonstrable potential for historic significant and that retain a sufficient amount of their essential character-defining features to visibly convey their historic identity, associated theme(s), and period(s) of development are to be documented and evaluated on a set of DPR 523 forms.

When surveying a large number of buildings with a common history—such as a development of mid-century Minimal Traditional residences or a tract of common Ranch-style homes—the buildings may be evaluated as a group on a Primary Record form (DPR 523A), District Record form (DPR 523D) or Building form (DPR 523B) and Continuation Sheets (DPR 523L) *if* the qualified architectural historian determines that the development has the potential to be eligible. The documentation should include photographs of representative house models. It should be noted, however, that the vast majority of residential tracts in the HSR study area are not likely to possess the potential for listing in the NRHP or CRHR and should instead be documented following the streamlined methodology described below. A residential development with the potential for eligibility would be one with no physical alterations, one that represents an early or prototypical example, one that is unusually large, one that incorporates innovative design qualities or mass-production techniques, one that represents a good example or an important phase of a master architect (particularly one of the following California tract home designers: Cliff May, Gregory Ain, Anshen & Allen, Edward Fickett, Jones & Emmons, Claude Oakland, Palmer & Krisel, and Carter Sparks), or one that represents an important example or stage in the career of a master builder (especially one of the following California merchant

builders: Joseph Eichler, George & Rober Alexander, David Bohannon, Fritz Burns, Ross Cortese, Henry Doegler, Earl Smith, Streng Brothers, and Lawrence Weinberg).[1]
This approach can be used for other property types, such as commercial, industrial, institutional, or linear properties (e.g. power lines or canals). Through thorough research of the history of the project section and property types, the QI should have gathered enough information to determine if the property has the potential to have been designed by a master architect or engineer; embodies significant design features; or was innovative either in its design or, for industrial properties, for its product or assembly methods.

Streamlined Documentation for Substantially Altered Properties

If a property has been altered to such a degree that it has lost the essential physical features that are important for its area of significance, or if a property has been altered to such a degree that its character-defining features are no longer visible enough to convey its historic identity, associated theme(s), and period(s) of development, then those alterations may be considered "substantial." A substantially altered property, including those located in an area of direct impact (ADI) that are proposed for demolition, can be documented using the streamlined documentation format. It should be stressed that each streamline documentation record needs to have adequate information to support the use of this format. Attachment C of the PA provides a format in which to present this information:

- Address
- Year constructed
- List of substantial and/or lost aspects of integrity
- Photograph (may be less than 3"x5" as long as it is legible)
- Date surveyed
- Optional information. The following documentation may be provided, but it is optional at the discretion of the QI:
  - Construction or historical information to understand the historic context (e.g., original use, original owner, architect, engineer, builder, and/or historic resident/tenant/user)
  - Historic context considered, if any, or state "no important historic contexts"

Streamlined Documentation for Minimally Altered Properties

In some instances, the streamlined documentation format can be used for resources that may be minimally altered and the QI reasonably determines that the property has no demonstrable potential for historic significance in accordance with NRHP criteria; there is no presence of community concerns; and it is not a potential contributing element within a larger property requiring evaluation, such as a historic or cultural landscape, traditional cultural property, or historic district. These could include resources representing a common architectural style, or are part of a large tract-housing development, or constructed as a mobile pre-fabricated home, including those located in an area of direct impact (ADI) that are proposed for demolition.

[1] For more information on these builders and architects, see *Tract Housing in California, 1945-1973: A Context for National Register Evaluation*, prepared by the California Department of Transportation (Sacramento, 2011).

Architecturally, for example, individual Minimal Traditional and Ranch-style residences, as well as tracts of Minimal Traditional and Ranch-style homes, 1960s-era commercial buildings configured as a strip mall, office parks, large industrial complexes with multiple buildings, and individual post-World War II metal-clad industrial buildings are plentiful in California, and most are not likely to possess significance under NRHP Criterion C or CRHR Criterion 3 because they lack distinction in terms of their type, period of construction, and method of construction. If such properties also lack significance because they do not represent the work of a master, they do not possess high artistic value, they are not a contributing element to a historic district, and they lack significance within their respective historic themes and periods, or they are not known to be associated with the lives of significant persons in the past through the in-depth study of the region as documented in the historic context of your section's Historic Architectural Survey Report, then they can be documented using the streamlined documentation format if they are only minimally altered.

For resources that are minimally altered please add the "optional information" in the documentation to support the decision to streamline the resource. This may mean more research is needed than that for streamlining significantly altered resources in order to support the decision to streamline the subject resource. Despite this additional work, it will still result in time saving for the surveyor/evaluator as well as the document reviewers. It should also be noted that in the "Context" field of the streamlined documentation examples, the identification of a historical theme or themes—e.g., industrial development, commercial development, agricultural development, or residential development—is sufficient *IF* there is adequate information in the Historic Context chapter of the HASR to support the use of the streamlined format. Information particular to a streamlined resource should be included in that resource's streamline form if it helps to support the decision to streamline it. It is the responsibility of the RC to provide adequate information to support the decision to streamline a resource.

Common Alterations

It is up to each RC to customize or add to the following list of common alterations as appropriate for the property types within its section. For example, some sections will need to focus on alterations common to large agricultural properties, while others will require concentrating on modifications typically made to urban or industrial properties. It is also the responsibility of the RC to determine, on a case-by-case basis, what alterations affect the integrity of a particular building or structure so that it may be documented as a streamlined property. The following list provides examples of common property alterations found throughout California and is not an exhaustive list of alterations that affect historic integrity.

- Windows
    - Original wood-sash windows replaced with historically inconsistent aluminum or vinyl-frame windows, as in the vinyl replacement windows in Figure 1 (below left).

Figure 1

Figure 2

- Original fixed-plate, commercial windows replaced with horizontally-sliding, aluminum or vinyl-sash windows, as in Figure 2 (above right).
- Original steel-frame casement windows replaced with historically inconsistent horizontally-sliding aluminum or vinyl-frame windows
- Resized window openings, as in the large, centered opening in Figure 3 (below left)

Figure 3

Figure 4

- Enclosed window openings, as in Figure 4 (above right).
- New window openings.

- Doors
  - Original doors replaced with new doors inconsistent with the original in style and/or materials, as in the doors visible in Figure 5 below.

Figure 5

Figure 6

  - Enclosed door openings, as in the infilled garage door opening in Figure 6 above.
  - Resized door openings
  - New door openings

- Wall cladding
  - Original wood siding replaced or covered with vinyl siding, aluminum siding, or stucco.
- Roof
  - Original roof cladding replaced with a historically inconsistent material
  - Altered roofline or roof type
  - Altered dormer

- Porches
  - Full or partial enclosure of an open porch, as in the partial-width porch enclosure fronting the façade of the Craftsman-style residence in Figure 7 below.

Figure 7

Figure 8

- Ornamentation
  - Removal of ornamentation characteristic of a specific architectural style or styles, as in Figure 8 above.
  - Addition of ornamentation historically inconsistent with a specific architectural style or styles
  - Addition of ornamentation that creates a false sense of history

- Additions
  - Additions that are out of scale or inconsistent with the original design, form, massing, and/or materials, as in the garage appended to a 1939 residence with Craftsman-style features in Figure 9 (below left).

Figure 9

Figure 10

- Additions appended to the primary elevation or those that are highly visible from the public right-of-way, as in the house in Figure 10 (above right), generally diminish integrity more so than additions affixed to a rear elevation or elevations that are not visible from the public right-of-way.
- Additions that are appended to the roof and that are highly visible from the public right-of-way (as in the examples shown in Figures 11 and 12 below), generally diminish integrity more so than additions appended to a rear elevation or elevations that are not visible from the public right-of-way.

Figure 11

Figure12

- Multiple-component properties
  - Multiple-component properties in which the majority of buildings, structures, or objects have been altered or removed, or where modern buildings have been added and only a few minor buildings or structures retain integrity. Streamline documentation for such properties should specify when a building or structure was added, removed, or demolished. This information is particularly important to support a streamline decision for borderline properties.
- Moved properties
  - Obvious signs that a building or structure has been moved or is not original to a site will substantially diminish the integrity of the property.
  - Such properties, however, may still be eligible for listing in the CRHR and may need to be recorded as a potential historical resource under CEQA.

Sample Streamlined Documentation for Substantially Altered Properties

Presented below are examples of substantially altered properties that were documented using the streamlined format in the Fresno to Bakersfield segment. When obtaining year built information and assessor's property data is not available, a circa year built based on maps, aerials, city directories or other sources may be used in the "Year Built," "Alterations," and "Building History" fields. Please note when such sources are used in the "Building History" field.

Please also see the Authority's technical guidance entitled "C. Historic Architecture Survey Report," an annotated outline of PA Appendix C, Technical Reports, dated August 28, 2013.

MR Number:	S09	APN:	48209047	City:	BAKERSFIELD	
Address:		7TH STANDARD	RD			
Year Built:	1937-1942, 1965	Context:	Industrial Development			
Alterations:	This complex of eight buildings and structures only contains two historic-era buildings constructed prior to 1965. Additional buildings and structures related to the complex have been removed and rebuilt.					Date Surveyed: 8/11/2015
Building History:	Additional years built - 1970s, 1981-94, 1994-2003					

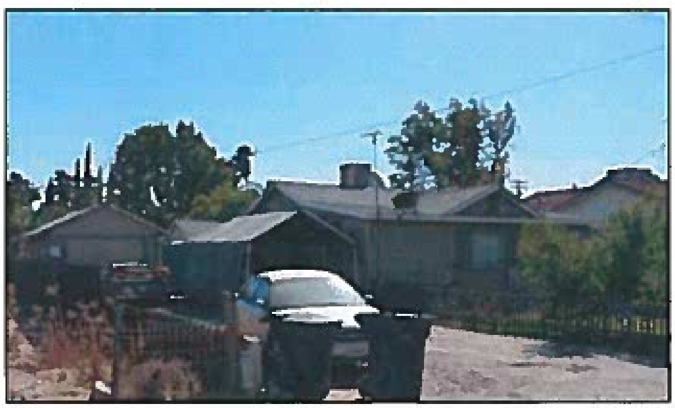
MR Number:	S07	APN:	48207020	City:	BAKERSFIELD	
Address:		COFFEE	RD			
Year Built:	1944, 1945, 1968	Context:	Industrial Development			
Alterations:	This parcel contains a collection of warehouse and packing-shed type buildings, and tanks. One warehouse or packing plant has been removed. Of the extant nine structures on this parcel only two are over 50 years old. These two buildings among modern structures do not have the ability to convey the history of the past complex of buildings.					Date Surveyed: 8/11/2015
Building History:	Two packing sheds constructed in the 1940s; Addition to northern shed between 1968 and 1975; Additional buildings and tanks added 1975-1981; Additional years built - 1977, 1980.					

MR Number:	S02	APN:	02703009	City:	SHAFTER	
Address:	101	WALKER	ST			
Year Built:	1958, 1965, 2004	Context:	Industrial Development			
Alterations:	This parcel contains a remnant of a previously industrial complex. The main processing unit was demolished and only a gutted warehouse at the southern end remains. Only the southern portion of the warehouse is over 50 years old. New buildings have been constructed on the northern portion of the parcel.					Date Surveyed: 9/14/2015
Building History:	Former APN - 02703007, 02707011					

MR Number:	S06	APN:	BEARDSLEY CANAL	City:	
Address:					
Year Built:	1973		Context:	Water	
Alterations:	The Beardsley Canal was recorded in 1995, once east of the APE, and once north of the APE where it joins Lerdo Canal. In 1997 SHPO determined that Beardsley Canal is not eligible for the NRHP/CRHR. One lateral, Beardsley One, in the APE was also determined ineligible in 2011. North Kern Water Storage District concrete lined the original 8 miles of Beardsley Canal in the 1940s, most of which is in the APE. The portion at Olive Drive in the APE was significantly realigned between 1968 and 1975 to cross the former UPRR tracks at a right angle.				Date Surveyed: 9/15/2015
Building History:	1873; widened and deepened c. 1880; lengthened from 8 to 25 miles c. 1890, reshaped, minor realignments, lined with concrete, and new control structures in the late 1940s, concrete curb installed to add depth 1974.				

Streamlined Documentation for Minimally Altered Properties

The following example represents a minimally altered property that would qualify for streamlined documentation.



Example 1 (left) is a modest, Minimal Traditional-style residence displaying a single alteration (a tri-partite, aluminum-frame replacement window) that constitutes the loss of one original feature (a steel-sash casement window). The alteration is considered minimal because the modification is reversible, the window opening has not been resized, and overall the building retains most of its original architectural features. Additional alterations may still be considered minimal or they may push the modifications into the substantial range, but in either case the building may still be documented using the streamlined format as long as the historic context and/or property typology included in the HASR adequately supports the conclusion that this property has little potential to be significant—even if it was completely original. Alterations to such common property types reduce their potential for significance and make the decision to streamline a resource defensible.

In addition to a description of alterations, the appropriate context or theme for these minimally altered resources needs to be identified in the streamline documentation form. For the residence depicted above, an appropriate context/theme could be "post-World War II residential development," "residential development in Fresno," or simply "residential

development." It is up to the QI to provide enough information on each streamlined record to adequately support the decision to streamline each minimally altered property. The historic context and built resources typology discussion in the HASR should be developed with enough detail so that the streamline documentation can reference the HASR in order to justify the decision to streamline that property.

The Historic Context section is to include a discussion of the various property types found within the study area. This discussion should be presented as a distinct sub-section of the historic context. Representative examples (with photos) of streamlined properties can also be included in this section.

Finally, the discussion in the Methods section of the HASR is to include how properties were screened (e.g., mention that the screening process was consistent with the guidance provided in the PA and this Technical Memorandum), as well as a description of the streamlined documentation format, whether or not there were any community concerns, and how the streamlined documentation is supported by information included in the Historic Context section and property type discussion of the HASR.

This technical guidance memorandum is the result of a collaborative effort between the cultural resources staff from the Authority, the RDP, and the various Regional Consultants. Kathleen Forrest of the State Historic Preservation Office reviewed the guidance and concurred with its approach.

CALIFORNIA High-Speed Rail Authority

Cultural Resources Technical Guidance Memorandum #8

Project Components to Consider When Establishing A Study Area or APE: A Communication Tool When Consulting with Design Engineers

This memorandum supplements the cultural resources Area of Potential Effects (APE) guidance outlined in Attachment B of the Section 106 Programmatic Agreement (PA as executed in 2011) for the High-Speed Rail Project (Project). It is intended to guide the Regional Consultant (RC) and the Engineering and Environmental Consultant (EEC) staff tasked with establishing a study area for records search, early survey and research, and an APE for the selected range of alternatives on behalf of the High-Speed Rail Authority (Authority) and the Rail Delivery Partner (RDP). The memorandum provides a list of common engineering features to assist the RC cultural staff in discussions with the EEC teams and to ensure that the delineated APE is justifiable and takes into consideration all of the known components of the project.

Statement of Problem

While Attachment B of the PA provides general guidance for establishing an APE for both archaeological and architectural properties under Section 106 of the National Historic Preservation Act (as amended), it does not elaborate on the types of engineering features and construction-related activities that can influence the delineation of those APEs. Engineering features such as grade separations, communication towers, and electrical substations, as well as construction-related activities related to those features, are often not identified early in the delineation of the study area. Insufficient knowledge of all the features that need to be considered when establishing an initial study area and subsequent refinement into an APE results in map revisions and insufficient survey coverage.

Background

Stipulation VI.A of the PA states that the Authority is responsible for determining the APE for each undertaking per the APE Delineation guidelines described in Attachment B of the PA. Attachment B states further that Qualified Investigators (QIs) would be used to assist the Authority in describing and establishing the APE.

An APE, as defined in 36 CFR 800.16(d), is "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking." Consequently, different APEs may be established for archaeological properties and historic architectural properties.

APE for Archaeological Properties

For archaeological properties, an APE is typically established based on an undertaking's potential for direct effects from ground-disturbing activities. On occasion, archaeological sites may also have qualities that could be affected indirectly.

APE for Historic Architectural Properties

Per the PA, the APE for historic architectural properties includes all properties that contain buildings, structures or objects 50 years of age or older at the time the intensive survey is completed by the QIs. The architectural APE is generally larger than the archaeological APE because it has to take into account changes to a property's setting and the introduction of visible or audible elements that may be out of character with the property.

Please see PA attachment B for more detail.

Project Features and Construction Activities to Consider

Provided below is a list of common engineering features and construction-related activities that may need to be considered when establishing a study area and for delineating an APE. Although not an exhaustive list, this is useful when discussing project plans and footprints with the designers.

Engineering Features	Construction-Related Activities
Tracks and train turnarounds	Construction of new tracks or removal/alteration of existing tracks. Construction involves ground disturbance. Could also cause visual or indirect effects.
Stations	Construction of a new building or removal/alteration of an existing building. Construction involves ground disturbance. Could also cause visual or indirect effects.
Station ancillary features (e.g., passenger platforms and shelters, walkways, bike paths, signage, lighting fixtures, bike racks, and fencing)	Construction of new features or removal/alteration of existing features; may involve ground disturbance. Could also cause visual or indirect effects.
Parking lots	Construction of a new parking lot or repair/resurfacing of an existing parking lot. Construction involves ground disturbance. Could also cause visual or indirect effects.
Cut and fill areas	Construction of these areas involves ground disturbance--excavation, grading, soil compaction, etc. Could also cause visual or indirect effects.
Railway corridor ancillary features (e.g., communication towers, positive traction towers, TPS, or any type of light or heavy maintenance facility)	Construction of new features or removal/relocation/alteration of existing features. Construction may involve ground disturbance. Could also cause visual or indirect effects.

CALIFORNIA High-Speed Rail Authority

Cultural Resources Technical Guidance Memorandum #9

File Naming Conventions for Technical Documents and Other Deliverables Uploaded to SharePoint

California High-Speed Rail has developed a file naming convention for cultural resources documents that are uploaded to the Cultural Resources libraries on High-Speed Rail SharePoint site. The objective of this naming convention is (1) to standardize file names across the various types of cultural resources-related documents; and (2) make the file names as succinct as possible, yet provide enough detail to quickly identify the contents of the document.

Please do NOT include dates in the file name. And do NOT change the name of the file when uploading a new version or editing an existing document. SharePoint retains all versions. Consequently a file name does NOT need to be changed for version control.

Also, please do not include "draft" or "final" in the file name.

The file names should include the following components, as applicable:

- Project Section
- Subsection (e.g., CVWye, LGA, CVI, etc.)
- Construction Package (CP) Number
- Technical Document type (ASR, HASR, PreCCAR, etc.)
- Addendum number (for a single digit addendum, please include "0", i.e. a03)
- Title of Re-Exam (*for HASRs only*)

Therefore the format for the file name of a technical report may be presented as follows:
Project Section_Subsection_ CP_Document Type_ addendum number_Title of re-exam (Please avoid dashes, spaces, periods, or other symbols. An exception would be for construction package 2-3: please use CP2-3.)

The above would apply to all cultural resources technical document types and other deliverables, including but not limited to the list provided in the table below (Please consult with your high-speed rail cultural resources staff for guidance if necessary):

AER	Archaeological Evaluation Report
AMP	Archaeological Monitoring Plan
APE	Area of Potential Effect maps
ASR	Archaeological Survey Report

ATP	Archaeological Treatment Plan
BETP	Built Environment Treatment Plan
FOE	Finding of Effect Report
GAR	Geoarchaeological Report
HABS	Historic American Building Survey
HAER	Historic American Engineering Report
HALS	Historic American Landscape Survey
HASR	Historic Architectural Survey Report
MOA	Memorandum of Agreement
PreCCAR	Pre-Construction Conditions Assessment Report
PSP	Protection and Stabilization Plan and Unanticipated Effects & Inadvertent Damage Plan
RS	Records and Literature Search Information
TCP	Traditional Cultural Property Evaluation Study
UDM	Unanticipated Discovery Memo

Examples:

1. A Merced to Fresno ASR, Addendum 8, prepared on August 16, 2016, for Construction Package 1 would be titled as follows: **MF_CP1_ASR_a08**

2. A Fresno to Bakersfield ASR, Addendum 10, prepared on September 28, 2016, for Construction Package 2/3 would be titled as follows: **FB_CP2-3_ASR_a10**

3. A Fresno to Bakersfield HASR, addendum 1, prepared on August 19, 2016, for the Locally Generated Alternative (LGA) would be titled as follows: **FB_LGA _HASR_a01**

4. A Fresno to Bakersfield HASR Addendum for the Wasco re-examination as part of Construction Package 4, dated July 4, 2016 would be saved as: **FB__CP4_HASR_Wasco**

5. A Pre-Construction Conditions Assessment Report (PreCCAR) or a Protection, Stabilization, Unanticipated Effects, & Inadvertent Damage Plan (PSP) would not typically include a Construction Package number because the reports are being completed in fulfillment of a mitigation measure identified in the project section BETP. For example:
   FB_PreCCAR_LakesideCemetery
   FB_PCP_7887 SMaple Ave

For questions, or if you would like to verify a file title prior to uploading, please email your High-Speed Rail cultural resources contact.

Utility-related features (e.g., electrical substations, transmission lines, traffic signal sheds, and trackside utility buildings)	Construction of new features or removal/relocation/alteration of existing features; may involve ground disturbance. Could also cause visual or indirect effects.
Concrete batch plants	Construction of new features or removal/relocation/alteration of existing features; may involve ground disturbance. Could also cause a visual or indirect effect, however if it is removed post construction, it may be considered to be temporary, and therefore not an adverse effect.
Staging areas	Removal/relocation/alteration of any existing features on the site; may involve ground disturbance. Could also cause visual or indirect effects, however if the site is restored post construction, it may be considered to be temporary, and therefore not an adverse effect.
Borrow areas and spoils storage areas	Removal/relocation/alteration of any existing features on the site; may involve ground disturbance. Could also cause visual or indirect effects, however if the spoils are removed post construction, it may be considered to be temporary, and therefore not an adverse effect.
Geotechnical boring area (e.g., test pile area)	Ground disturbance--excavation, grading, soil compaction, etc. Unlikely to result in visual or indirect effects.
Roads (permanent) and temporary access roads	Construction of new permanent roads, construction of new temporary access roads, ground disturbance--excavation, grading, soil compaction, etc. Could also cause visual or indirect effects.
Sound walls	Construction of new sound wall or removal/alteration of existing structure; may involve ground disturbance. Could also cause visual or indirect effects.
Bridges and overpasses	Construction of a new bridge or overpass or the removal/alteration of an existing structure; may involve ground disturbance. Always extend APE to where the road conforms.
Tunnels and underpasses	Construction of a new tunnel or underpass or the removal/alteration of existing features. Construction of these features involves ground disturbance. Could also cause visual or indirect effects.
Canals, ditches, and other waterways	Construction of a new canal or ditch or realignment of an existing water conveyance feature. Construction of these features involves ground disturbance. Could also cause visual or indirect effects.
Levees	Construction of a new levy or the removal/alteration of an existing levee. Construction of these features involves ground disturbance. Could also cause visual or indirect effects.
Biological mitigation areas	Restoration of land to its natural state, such as recreating wetlands, requires ground disturbance. Could also result in visual or indirect effects.
Tunnel ventilation structures	Construction of tunnel vents involves ground disturbance and may result in visual or indirect effects.

This technical guidance memorandum is the result of a collaborative effort between the cultural resources staff from the Authority, the RDP, and the various Regional Consultants.

CALIFORNIA High-Speed Rail Authority

Cultural Resources Technical Guidance Memorandum #10

Cultural Resources Compliance for Re-Examinations

This memorandum focuses on compliance with Cultural Resources requirements for re-examinations (re-exams). This includes guidance in the modification of Area of Potential Effects (APE) maps; process for consulting parties' notification of APE modification; technical reports required for re-exams; and the review, approval, and concurrence process for technical reports. Attached are two flow-charts illustrating the compliance process for re-exams – one for archaeology and one for built resources.

APE Modifications

If a re-exam includes areas outside of the approved APE, an APE modification is required and notice of the modification will be sent by the California High-Speed Rail to consulting parties, including tribes, other consulting parties, and the State Historic Preservation Officer (SHPO).

APE Modification Delineation

Archaeological and Built Resources APEs generally vary in order to adequately address potential effects to the different resources. However, for both archaeological and built resources APE modifications, please include entire legal parcels if they will be purchased. Additionally, for in-road utility relocation, please limit both the APEs to the area of direct impact. Below are some general differences.

Archaeology: For large rural properties to be purchased, please note that only the areas to be used for construction activities (including excess parcel demolition, construction access and laydown areas) need to be surveyed for archaeological resources. **No area that has not been surveyed for archaeological resources may be used for any reason.**

Built Resources: For large rural properties that do not include built resources, do not expand the built resources APE.

Please consult with High-Speed Rail regarding APE delineation. Please provide a draft APE (GIS or KMZ) for review and approval prior to commencing studies.

APE Modification for Consulting Party Notification

Once High-Speed Rail approves the APE expansion, please provide the following to High-Speed Rail:

Reduced-sized PDF map of changes. This map should be relatively simple and include both the current built resources and archaeological APE and clearly illustrate the expansion. A sample is provided below (Figure 1). Please note that this map may lack the detail needed for a formal

- APE that would be submitted with an archaeological survey report (ASR) or historic architectural survey report (HASR).
- Only include areas where the APE changes. While scale will differ based on the size of the re-exam, there is no need to include the entire current APE where there are no changes.
- Include an index page in the map as page 1.
- File size of map should be less than 10 MB whenever possible (for emailing).

- The colored overlays should be transparent to allow for some visibility of the resources on the ground.
- If there are areas where the revised APE is smaller than the original, leave the original APE boundary and do NOT shrink the APE. Maps should show only those areas that have expanded.
- Provide a brief project description that generally describes why this re-exam (and therefore APE modification) is necessary. The length of the project description may vary, depending on the size and complexity of the re-exam, but need not include all project elements, including anticipated depths of excavation. Generally one or two paragraphs will suffice.
- This package will be sent electronically by the California High-Speed Rail to consulting parties.

Archaeological Survey Report (ASR) Addenda for Re-Exams

The programmatic agreement (PA) allows for phased identification, consequently an ASR does not have to be completed for a re-exam if full access is not granted prior to completing the re-exam. Archaeological surveys and the completion of the ASR are generally in response to construction priorities and access rather than the re-exam. **All areas where construction is planned must be surveyed and an ASR completed and approved prior to any ground-disturbing work. This may impact the construction schedule.** Please see attached Archaeological Re-Exam Process flowchart.

Historic Architectural Survey Report (HASR) Addenda for Re-Exams

An addendum HASR may be required to support a re-exam if the built resources APE is expanded or if the work within the current APE differs from that considered during the environmental phase. While built resources may be subject to phased identification, all resources that can be seen from public ROW must be surveyed and the results, including SHPO concurrence, must be included in the re-exam. If all resources within a built environment APE expansion are exempt per the PA, a memo supporting this determination will be required as an attachment to the re-exam. The memo is to be reviewed and approved by High-Speed Rail; no SHPO concurrence is required. Please see attached Architectural History flowchart.

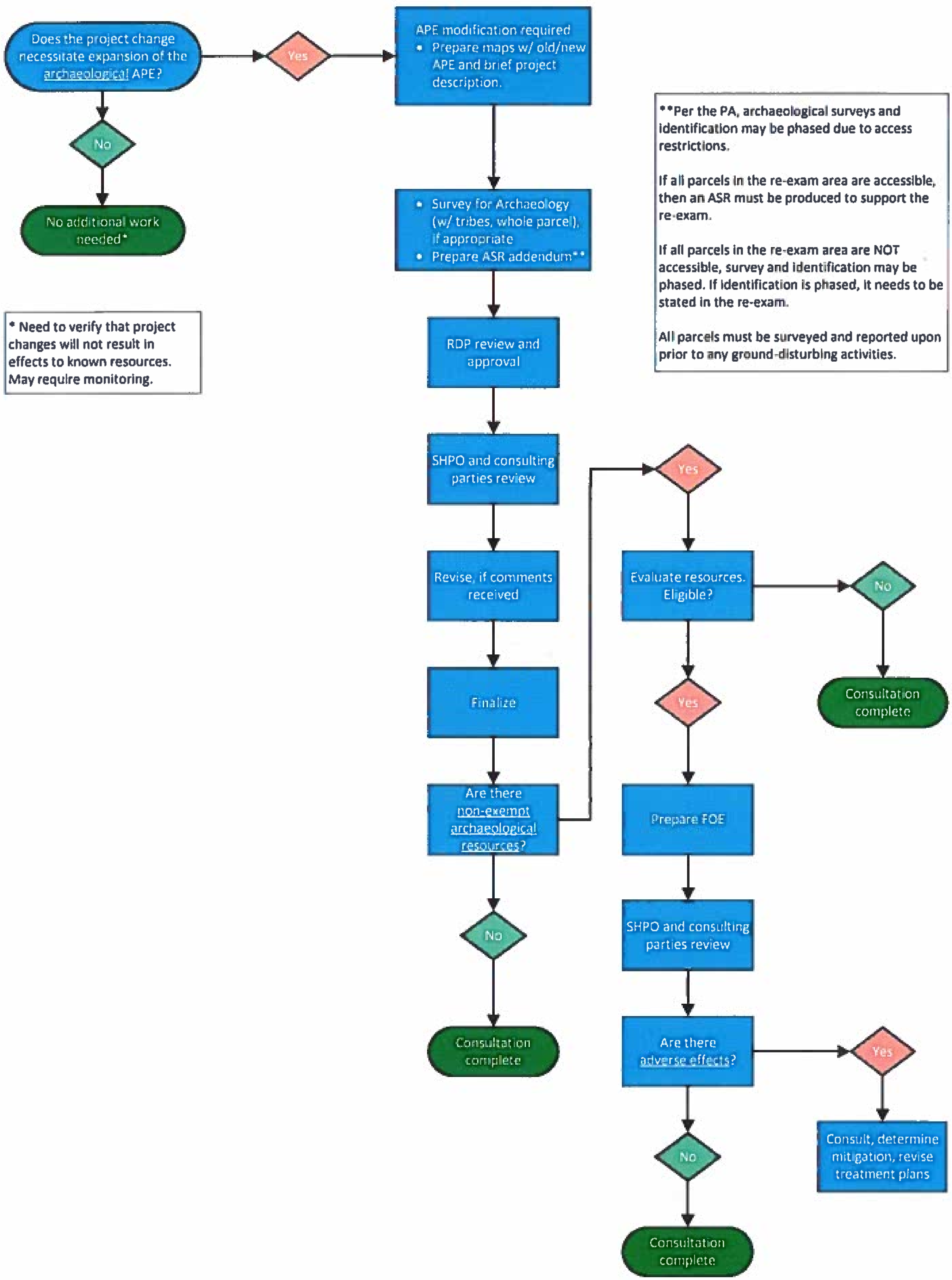
Contacts/Roles for Re-Exams and APE Modifications

Coordinator/Archaeology Reviewer:	**Alisa Reynolds**	reynoldsa1@pbworld.com	415-243-4766
Built Resources Lead:	**Monte Kim**	kimmg@pbworld.com	916-384-9987
APE Modification notifications Consulting Parties/Tribes consultation:	**Sarah Allred**	Sarah.Allred@hsr.ca.gov	916-403-0061

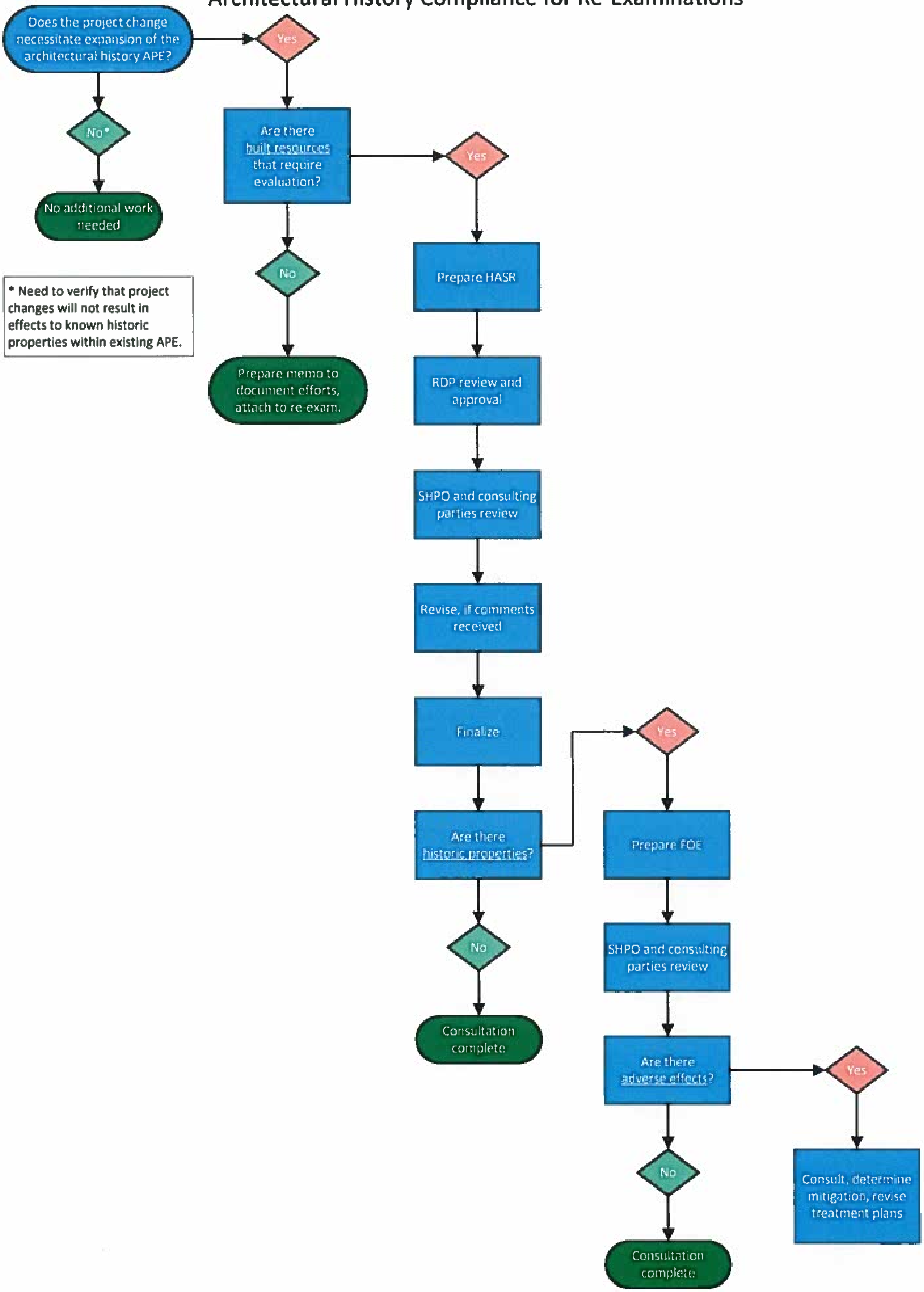
Please see example map on the following page. The example shows BOTH archaeological and built resources revised APE; not all design changes will necessitate changes to both APE.


CALIFORNIA
High-Speed Rail Authority
LEGEND
Existing Project Archeological APE
Modified Project Archeological APE
Existing Project Historic Architectural APE
Modified Project Historic Architectural APE

Archaeological Compliance for Re-Examinations



Architectural History Compliance for Re-Examinations



CALIFORNIA High-Speed Rail Authority

Cultural Resources Technical Guidance Memorandum #11

Guidelines for the Print/CD Production of Cultural Resources Studies

As of January 2017, this memo has been retired. The Authority will direct the RC to supply hardcopies and CDs as appropriate on a section-by-section basis.

Thank you

Purpose of Memo:

The purpose of this memo is to provide standard specifications for the production of cultural resources studies—in both hard copy and CD format—for submittal to the Authority, It should be noted that the specifications prescribed here are not intended to address: (1) the actual internal formatting of the documents (i.e., fonts, margins, pagination, etc.); or (2) the labeling or transmittal of the digital files of these studies that are uploaded and maintained in SharePoint.

Background: Nomenclature for HSR Cultural Resources Reports:

Typically a few different document versions are produced for each cultural resources study completed for the HSR Project. These different document versions are defined as follows, in chronological order:

(1) ***SHPO/Consulting Party Review Draft*** Authority/RDP/FRA comments addressed, and ready for submittal and review by SHPO/Consulting Parties;
);
(2) ***Draft Final*** Internal draft in which SHPO/Consulting Party comments are addressed, and ready for final review by Authority/RDP/FRA, prior to distribution to SHPO/Consulting Parties;
(3) ***Final*** Print-ready version for final production and distribution to Signatories/Consulting Parties, upon approval from Authority/RDP/FRA. In this version SHPO/Consulting Party comments are addressed.

The specifications below apply only to document version type 5 listed above. (Types 1 through 4 are typically internal working drafts that are shared via digital files; they are not generally produced as a formal finished product in either hardcopy or CD formats).

Specifications for hardcopy (paper) copies:

Color versus black-and-white: all copies should be printed in color mode.

One-sided versus two sided printing: all copies should be printed in two-sided mode, with the exception of 11x17 sheets, which should be printed in one-sided mode.

Binding: all copies should be bound using comb bindings or three-ring binders (three-rings are preferred for larger reports). Three-ring binders should have translucent covers for the insertion of a title page and a spine label. Spiral (wire) bindings should not be used for any versions of any studies.

Special instructions for 11x17 sheets within a larger text-based document: should be printed in one-sided mode, and should be tri-folded to fit within the 8.5x11 format.

Special instructions for stand-alone 11x17 documents (e.g., mapbooks): should be printed in one-sided mode, and can be bound in full 11x17 format without tri-folding; should always be comb-bound in this scenario.

Specifications for CD copies with PDFs only:

Labeling of CDs: the CDs themselves (as opposed to the cases) should be professionally labeled (i.e., "stamped", not labeled by hand) using a similar HSR Authority graphic scheme as the cover of the report (see Figure 1, below).

Required information for label: the following classes of identifying information should always be included on the "stamped" label: HSR Section, sub-section (if appropriate), report type, addendum number (if appropriate), version of report (i.e., draft vs. final), and the date of the report (month and year only).

Titling of files contained on the CD: because CD copies will be sent to outside parties, it is important that the actual document files on the CD be clearly labeled with words (rather than numerical codes used in document control systems) to facilitate review. The PDF files on the CD should therefore have titles that closely correspond with the key information on the title page of the document and on the stamped label on the CD. This information includes: HSR Section, sub-section (if appropriate), report type, addendum number (if appropriate), version of report (i.e., draft vs. final), and the date of the report (month and year only). The use of acronyms or abbreviations is acceptable here in order to shorten file names. [Example of a good document title: *Merced to Fresno – HASR – Addendum 1 – Final – August 2013.pdf*]

Packaging of CDs (i.e., cases): each individual CD should be packaged in translucent "jewel" case (the thinner "slimline" variety is preferred, but the thicker style of case is acceptable). The CDs should not be packaged in paper sleeves. The plastic "jewel" cases should <u>not</u> be labeled in any fashion; only the CDs themselves should be labeled.

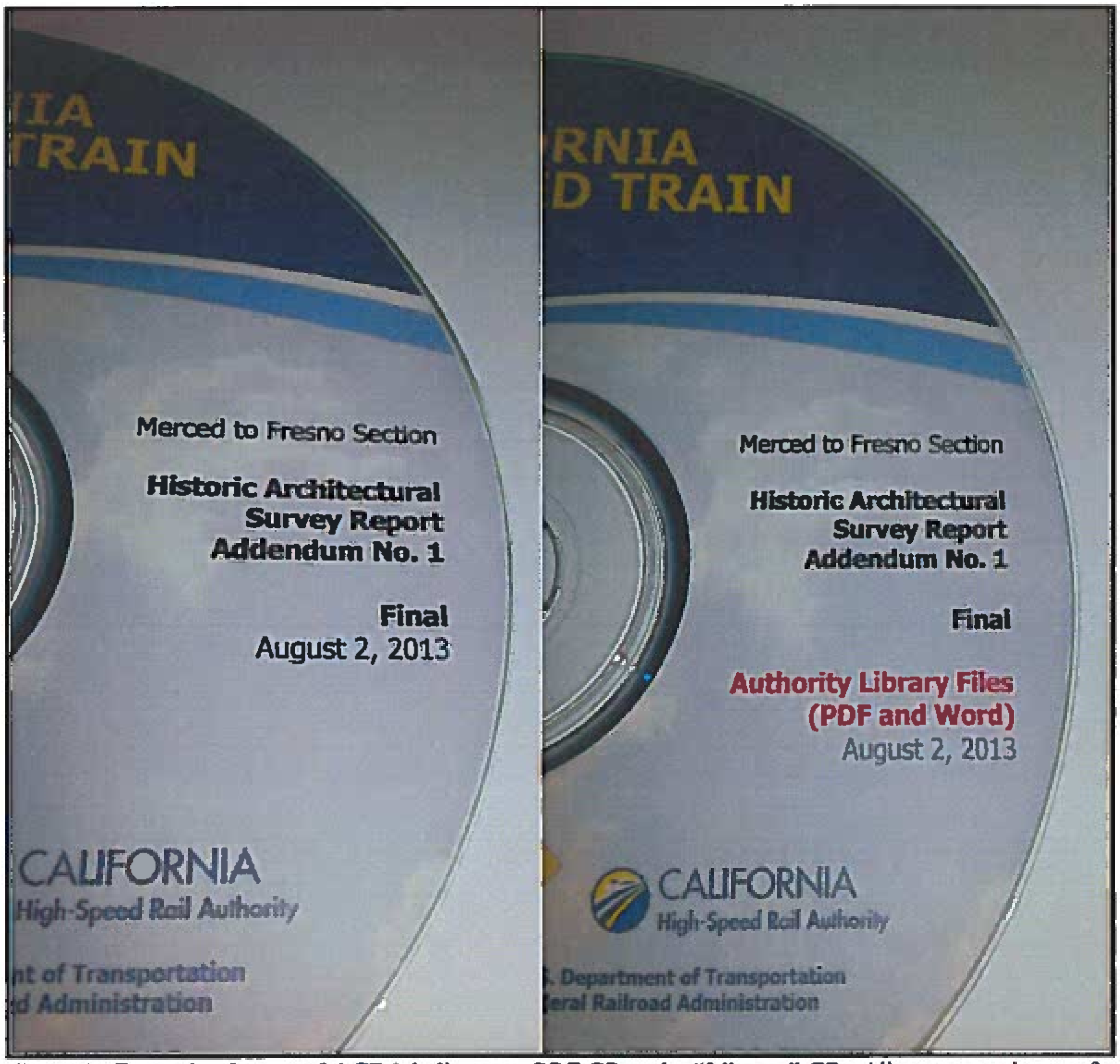


Figure 1: Example of successful CD labeling on a PDF CD and a "Library" CD. All necessary classes of identifying information are included, and the library copy is clearly marked as such. Graphics and text were imported from the cover page of the technical study, giving the CD a professional appearance for distribution to external parties.

Number of copies to be produced for each report type:

"Draft" reports (including "SHPO/Consulting Party Review Draft" and "Second SHPO/Consulting Party Review Draft"):

(1) 2 hardcopies (paper)
(2) 10 CDs with PDF-only files
(3) 2 CDs with Word-processing files (e.g., Microsoft Word document file)

"Final" reports:

(1) 8 hardcopies (paper)
(2) 10 CDs with PDF-only files

(3) 2 CDs with Word-processing files (e.g., Microsoft Word document file)

Note: the numbers above for either draft or final reports may be modified on a special-case basis for especially large and bulky studies, unusual studies, or studies of broader interest or interpretive value (such as for a Traditional Cultural Property [TCP]) that may be distributed to a larger external audience beyond HSR reviewers and consulting parties.

CALIFORNIA High-Speed Rail Authority

Cultural Resources Technical Guidance Memorandum #12

Approval Protocol for Negative Archaeological Survey Reports

The protocol described in this memo applies only when the phased historic properties identification effort results in a negative records search and negative findings through archaeological survey, as noted below. If the Design-Build's (DB) Qualified Investigator (QI) determines that an archaeological survey is negative, the Authority will ensure that the QI completes an addendum ASR, including the content, methodology, level of effort, and documentation requirements as described in PA Attachment C, with all relevant supporting data included. To be considered a negative addendum ASR (NASR), each of the following criteria must be met:

1. Record search has been completed and no archaeological resources are recorded in the APE, with a buffer agreed upon in consultation with the Authority.
2. Archaeological pedestrian survey has been completed with no resources identified, or the area is completely covered/paved.
3. A designated tribal participant (as pre-identified by the Authority) accompanied the archaeological surveyors. Or, a tribal participant was invited to accompany the surveyors, but declined to participate.

Review and Approval Process

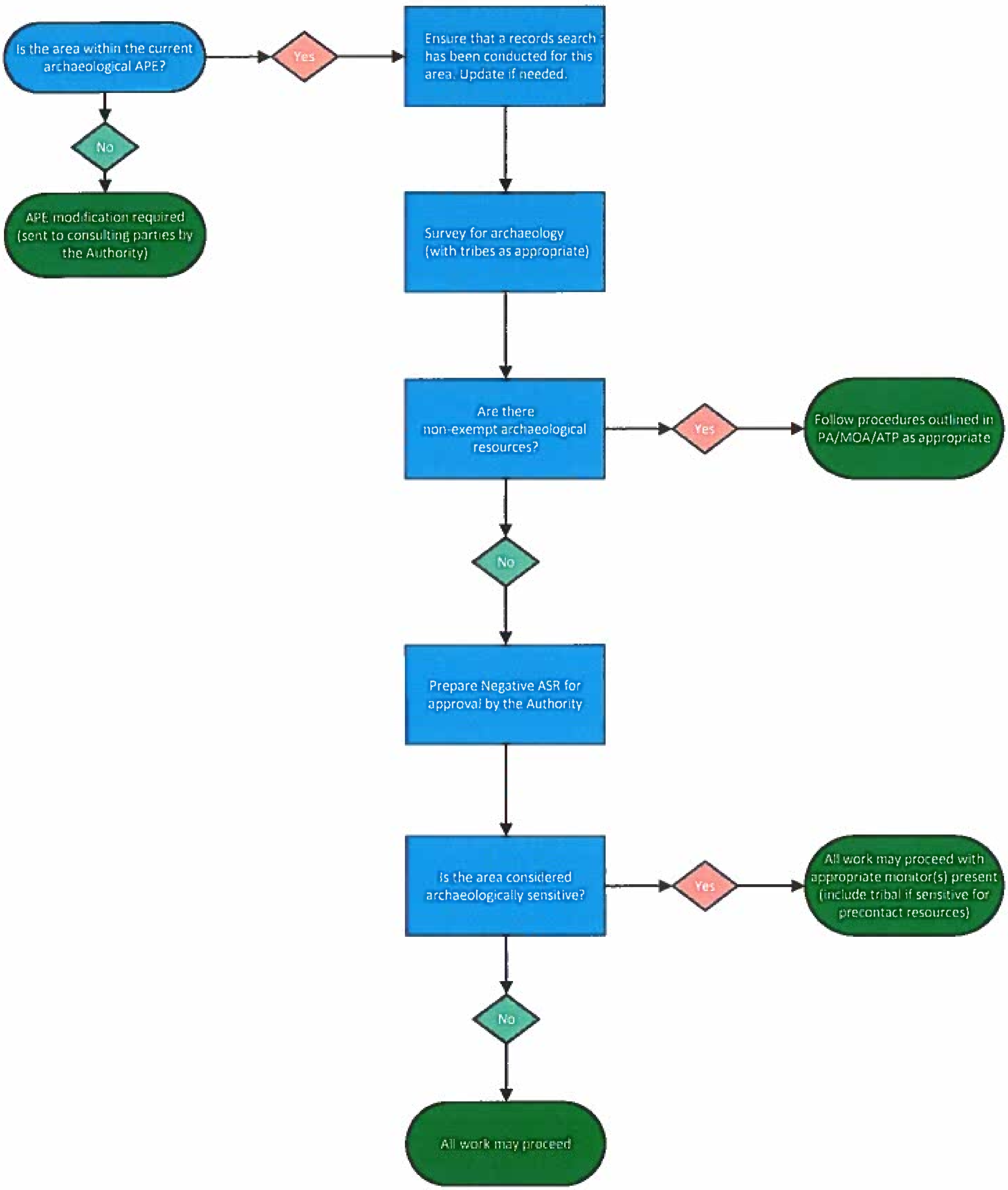
A NASR will be approved through the following process:

1. DB submits draft NASR to PCM QI.
2. PCM QI reviews for adequacy, finalizes and approves draft for forwarding.
3. PCM QI submits draft NASR to Authority.
4. Authority reviews and approves draft NASR.
5. PCM QI submits final NASR to Authority.
6. Authority approves work to proceed.

Once a NASR has been approved by the Authority through this process, work may proceed at that location subject to any archaeological and/or tribal monitoring requirements as recommended in the NASR. Monitoring will be required if the area is determined to be sensitive pursuant to parameters defined in the monitoring plan or geotechnical technical studies, or if ground surface visibility is very limited, such as paved or covered with fill. The NASR process is outlined in the attached flow chart.

Authority will ensure all final NASRs produced during each Annual Report reporting period are documented in the Annual Report; a CD of all NASRs produced during the reporting period will be provided to all MOA signatories, except for the ACHP, and tribal consulting parties.

Negative Archaeological ASR



MEMORANDUM 13 NOT DISTRIBUTED, NO LONGER NEEDED, 1-13-2017

CALIFORNIA High-Speed Rail Authority

Cultural Resources Technical Guidance Memorandum #14

Screened Construction Activities Exempt from Further Review: Memo Format and Content

Certain construction activities have potential to affect historic properties. However, *The Second Amendment to the Memorandum of Agreement (MOA) Among the Federal Railroad Administration (FRA), the Surface Transportation Board (STB), the California High-Speed Rail Authority (Authority), and the California State Historic Preservation Officer (SHPO), Regarding the Merced-Fresno Section of the California High-Speed Train System in Merced, Madera, and Fresno Counties*, (M-F MOA, Second Amendment) and *The First Amendment to the MOA Among the FRA, the STB, the Authority and the SHPO Regarding the Fresno to Bakersfield Section of the California High-Speed Train system in Fresno, Kings, Tulare, and Kern Counties* (F-B MOA, First Amendment) Stipulation 2, allow for certain construction activities to be "screened" as follows:

> The Signatories have identified classes of construction activities that have the potential to affect historic properties, but following appropriate screening in accordance with the screening process outlined in Attachment 1 to this Amendment, may be determined exempt from further Section 106 review (Screened Activities). The Authority will ensure that this process is satisfactorily followed and adequately documented. Notwithstanding the foregoing, the Authority will ensure that activities that occur in areas of archaeological sensitivity will be monitored by Qualified Investigators and consulting Native American Tribes during all ground disturbing activities, regardless of the outcome of the screening process.

Screened construction activities are not exempt from archaeological monitoring by QIs. If the activity that is screened is in an archaeologically sensitive area, the activity is to be monitored by QIs and, if available, Native American monitors.

Background and Statement of Problem

Access to parcels for archaeological pedestrian surveys prior to the completion of the Merced to Fresno and Fresno to Bakersfield sections Environmental Impact Reports/Environmental Impact Statements was minimal, resulting in the need to postpone the majority of the identification of archaeological properties to after the record of decision (ROD). The Programmatic Agreement (2011 PA) requires a Memorandum of Agreement (MOA) to be negotiated for each project section, along with an associated archaeological treatment plan (ATP). These documents define the post-ROD phased process for archaeological survey, reporting, and consultation once access to the parcels is granted, a

process that must be completed prior to any ground disturbing activities in the given location.

Because the HSR is being constructed as a "design-build" project, activities such as geotechnical testing to inform the design, had not been undertaken prior to the ROD. Consequently design and construction is occurring concurrently; this construction approach, along with the expedited schedule, has resulted in the need to identify construction-related activities that may be exempt from further Section 106 review, minimizing the lengthy document review period. This screening process also addresses site conditions, such as paved areas, where surveys are not warranted. Such activities are to be "screened", following the guidance presented in Attachment 2 of the two subject MOA amendments.

Memorandum Format

The following information is required in every Screening Memo (see attached sample):

- Name of the Design-Builder's (DB) Qualified Investigator (QI) responsible for the documentation
- Name of the Project Contract Manager (PCM) QI reviewing the document
- Date the memo was prepared
- Construction Package #
- Work proposed
- Identity of who made the request to review for screened activities, date of request, and what materials were provided
- Written description of site
- Map attached indicating limits of the area where the activity is being screened
- Citation of the Section 106 document allowing the activity to be screened
- Background research and results justifying screening
- Applicable "screenable" construction activities with brief description
- Finding that Section 106 is complete, and that the undertaking is exempt from further review **unless it is in an area determined to be archaeologically sensitive**
- If it is in an archaeologically sensitive area, state that monitoring by QIs and consulting Native Americans (if available)) are required during ground disturbance
- Caveat that, if the activity changes, it will need to be re-evaluated as "screenable"
- DB QI contact information and signature
- PCM QI approval signature box
- Attachments, as needed

Review and Approval Process

The DB QI is responsible for preparing the screening memo to adequately support the decision that the construction activity may be screened. The PCM QI is to review the memo for adequacy and will return the memo to the DB QI if he/she determines that it is not

sufficient. Until the PCM QI signs the signature block at the bottom of the memo, no ground disturbance may occur at the proposed location. Ground disturbing activities may commence once the PCM QI signs the memo.

The PCM QI will prepare a monthly screening report for the Authority cultural resources staff, summarizing the screened activities, and reporting any archaeological discoveries, with all memos as attachments. The Authority/RDP will report on screened construction activities in MOA annual reports.

DOCUMENT PLACEHOLDER: EIR/EIS CHAPTER 3 SECTION 3.17 CULTURAL RESOURCES ANNOTATED OUTLINE

APPENDIX D: ADDITIONAL RESOURCES

This appendix provides additional information relevant to conducting California High-Speed Rail (HSR) environmental impact analysis and preparing environmental impact report/environmental impact statement documents. For materials that are not prepared by, or the property of the California High-Speed Rail Authority (Authority), the Authority has received permission from the authors to list these materials in the environmental methodology guidelines. Any other use or publication of these materials by, or on behalf of the Authority is subject to prior written permission by the authors or other owners of copyrighted materials.

See Appendix A for an inventory of technical guidance by the Authority.

Title	Author(s)	Firm/Agency	Publication Date	Date Appended to EIR/EIS Methods
Environmental Guidance to HSR Regional Teams—EIS/EIR Revised CHSR Program Implementation and Ridership Assumptions, and Project Lexicon	Dave Shpak and Bryan K. Porter	California High-Speed Rail Program Management Team	June 2014	June 2014
Deferring Mitigation Details—No Problem, If...	Curtis Alling and Sydney Coatsworth	Ascent	n/a	June 2014
It Looks Like Mitigation. It Sounds Like Mitigation. But Can it Be Part of the Project?	Gary Jakobs and Curis Alling	Ascent	May 2014	June 2014

Environmental Guidance to HSR Regional Consultant Teams

June 30, 2014

From: Dave Shpak, PMT Environmental Planner
Bryan K. Porter, PMT Interim Environmental Manager

RE: EIR/EIS Revised CHSR Program Implementation and Ridership Assumptions, and Project Lexicon

Purpose

The purpose of this environmental guidance is to outline the California High-Speed Rail (Authority) Program assumptions that will be incorporated into future environmental documents. Each EIR/EIS must be an integrated and internally consistent document. The responsibility for preparing the environmental documents resides with the Regional Consultants (RC). The Program Management Team (PMT) and Authority staff will provide checks on quality of the document and adherence to program assumptions, format, and methodology. Legal reviews by the Authority, Attorneys General (AG), Authority or AG consulting counsel, and the Federal Railroad Administration (FRA) will focus at a higher, general level of detail related to CEQA/NEPA compliance, presentation of alternatives, and compliance with environmental laws and regulations.

This memorandum provides guidance on the "blended approach" for implementation of the California High-Speed Rail (HSR) program and projects, identifies the baseline years to be used in analyses for environmental documents, and sets forth the ridership assumptions that will be incorporated into these documents. This guidance also establishes a partial lexicon of key terms for describing the project in the environmental documents. This memo is intended to be used in conjunction with the Project EIR/EIS Environmental Methodology Guidelines, Version 5 and Guidance on the Preparation of Technical Appendices to provide comprehensive direction for preparation of the HSR project-level EIR/EIS and associated studies for each section of the system.

Program Implementation Assumptions

Blended Approach from the Business Plan

The 2012 and 2014 Business Plans provide the current implementation strategy for the HSR system. Key components of the Business Plan are:

1. Phased implementation of the HSR System starting in the Central Valley, with parallel early investments in the "bookends", followed by incremental implementation from the Central Valley to connect outward to San Jose in the north and Palmdale in the south, and finally implementation of the bookend sections;
2. A "blended approach" for the bookend sections to complete Phase 1; and
3. A longer implementation time frame to achieve the 800-mile Full System (i.e., extending beyond Phase 1 to Phase 2).

Attachment A summarizes the program assumptions for the HSR system, derived from the 2014 Business Plan, including the time frames for implementation and the general service assumptions for the HSR system during each implementation phase.

Analysis Timeframes

The issue of the proper environmental baseline for traffic analysis (and related analyses for air quality and greenhouse gas emissions, energy, noise and vibration) has been the subject of extensive CEQA case law since 2010, culminating with the 2013 California Supreme Court decision in *Neighbors for Smart Rail vs. Exposition Metro Line Construction Authority* (2013) 57 Cal.4th 439, 447-457. *Neighbors* essentially concludes that traffic analysis should be presented using a baseline (pre-project conditions) year that matches when a project will commence causing traffic impacts. The Court calls this a “date-of-implementation” baseline. The traditional analysis using some date in the future that is not directly tied to the project implementation year no longer can be relied upon by itself.

The substantial differences in timing and circumstances associated with HSR construction, initiation of HSR operations, interim and full HSR operations requires use of progressive baselines for thorough analysis of potential transportation, air quality and greenhouse gas, energy, noise and vibration impacts. This approach will capture changes in resource conditions and effects resulting from planned traffic improvement projects and ramp-up of HSR operation. For example, Regional Transportation Plans (RTP) include funded transportation projects that are programmed to be constructed by 2040, or subsequent horizon years in later RTPs. These projects are reasonably expected be in place before the HSR project reaches maturity (i.e., the point/year at which HSR-related transportation generation reaches its maximum). An accurate prediction of expected conditions for evaluation of the HSR project’s air quality and greenhouse gas impacts must consider these planned transportation improvements in the underlying background conditions to which HSR project effects would be added. The following baselines for analysis are consistent with the *Neighbors* conclusions and relate to the Business Plan steps for planning and implementation.

1. <u>Existing Conditions</u> at issuance of the NOP or initiation of environmental analysis
2. <u>Baseline #1: Existing + Construction Year</u>. This baseline is applicable to all environmental and community impact analyses.
3. <u>Baseline #2: Date of Project Implementation</u>. This baseline applies to transportation, air quality and greenhouse gas, energy, noise and vibration impact analyses. Baseline #2 is indexed to the most recently adopted Business Plan and the years of implementation for the Initial Operating Segment, Bay to Basin, and Phase 1. Implementation is the year that trains begin operation in the step of the HSR program relevant to each particular HSR section (e.g. for the 2014 Business Plan: 2022 for Initial Operating Segment, 2027 for Bay to Basin, 2029 for Phase 1).
4. <u>Baseline #3: Interim Terminus Stations</u>. This baseline applies to transportation, air quality and greenhouse gas, energy, noise and vibration impact analyses of interim terminus stations, where applicable. The Authority will consider the potential consequences of the maximum ridership between the date of implementation and the horizon year in consultation with the FRA and station cities.
5. <u>Baseline #4: Completion of Phase 1 (a.k.a., Horizon Year) with Full Ridership</u>. This baseline is applicable to all environmental and community impact analyses and evaluation of cumulative impacts. The horizon year is indexed to the most recently adopted Business Plan and applicable RTP (per NEPA practice). The current horizon year for HSR is 2040, but years will advance as the Business Plan and applicable RTP(s) are updated. This baseline may also consider completion of Phase 2 in future studies, as warranted by Authority business planning and as directed by the Authority.

Ridership

With the adoption of the 2012 Business Plan, the Authority directed that all future environmental analyses be consistent with the current Business Plan. Subsequently, an upgraded model to forecast ridership and revenue for the 2014 Business Plan was developed to comply with the requirements of SB 1029, reflect

the recommendations of the Ridership Technical Advisory Panel, consider interim phases of HSR implementation, and incorporate new and re-analyzed data.

The PMT will furnish operating/service plans used for the current Business Plan and provide updated ridership forecasts for the following years, along with recommended methodological approach for adjustments to proposed year of analysis (if needed):

- 2010
- 2022 No Build
- 2022 IOS - Burbank Terminus
- 2029 No Build
- 2029 Phase 1 to LA Union Station
- 2040 No Build
- 2040 Phase 1 to LA Union Station
- 2050 No Build
- 2050 Phase 1 to LA Union Station

The RC will present these ridership forecasts in EIR/EIS Volume 1 Chapter 2 and use them for the analyses in EIR/EIS Volume 1 Chapter 3. The PMT will provide methodology to assess ridership for interim stages of HSR implementation where needed to identify temporary impacts of a particular stage (e.g., Initial Operating Section, Bay to Basin). The PMT will also provide an updated ridership appendix and updated operations appendix for the remaining Phase 1 EIR/EIS documents.

The ridership forecasts for the Business Plan will serve as the basis for early planning, such as integration with connecting transit service and the sizing of parking facilities. The design features of the HSR system, such as the station platforms, are based on design standards for full system build-out, particularly for terminal capacity.

The PMT will work with Cambridge Systematics, an outside consultant, to provide a full set of ridership forecasts to the RCs for their use in future environmental documents. Environmental impacts must be assessed on the basis of high-end ridership forecasts for full utilization of the Phase 1 System from the Business Plan (corresponding to the 75^{th} percentile of uncertainty). Environmental benefits must be assessed on the basis of medium ridership forecast scenarios, which correspond to the 50^{th} percentile of uncertainty.

SB 1029 (July 2012) requires that the Business Plan be updated every two years. The schedule for publishing environmental documents over the next several years may lead to periods during which ridership forecasts are updated by a new Business Plan after analytical assumptions were fixed for environmental analyses. As the Authority derives new ridership data from the latest Business Plan projections, and the RC updates environmental analyses based upon the new data, environmental documents must explain the progress of assumptions and modeling from the previous environmental analyses. The integration of evolving ridership data and forecasts makes the Business Plan the driver for environmental analysis and design work.

Future environmental documents will rely on ridership forecasts from the most recently adopted Business Plan. Based on the 2014 Business Plan environmental milestone schedule and SB 1029 Business Plan update requirements, the anticipated sequence of Business Plans and project-level environmental documents is:

2014 Business Plan

- Supplemental Alternatives Analyses for Palmdale to Burbank and Burbank to Los Angeles
- Supplemental Alternatives Analyses for Bakersfield to Palmdale
- Supplemental Alternatives Analyses for Los Angeles to Anaheim
- Central Valley Wye Draft and Final SEIR/SEIS

- Palmdale to Burbank Draft and Final EIR/EIS
- Bakersfield to Palmdale Draft and Final EIR/EIS
- Burbank to Los Angeles Draft and Final EIR/EIS
- Los Angeles to Anaheim Draft and Final EIR/EIS

2016 Business Plan

- San Francisco to San Jose Draft and Final EIR/EIS
- San Jose to Merced Draft and Final EIR/EIS

Future Business Plans

- Los Angeles to San Diego Draft and Final EIR/EIS
- Merced to Sacramento Draft and Final EIR/EIS

The Central Valley Wye Subsequent EIR/Supplemental EIS will focus on alignment and train operation issues based upon the service plan for the 2014 Business Plan. While complete re-analysis of the full HSR section is not warranted, the document must explain the differences between the 2009 planning assumptions and forecasts and those in 2014. The conclusions in the Merced to Fresno document, based upon 2009 ridership assumptions, would remain a worst case analysis for the assessment of environmental impacts.

Project Lexicon

Consistency within and between HSR environmental documents is dependent, in part, upon consistent terminology. The following are several key terms for describing the HSR system and the phased and blended implementation strategy. See the *California High-Speed Rail Project EIR/EIS Environmental Methodology Guidelines, Version 5*, and the *High-Speed Rail Authority Style and Branding Guide* for definitions of other terms.

***High-Speed Rail (HSR)**:* The general state-wide system of the integrated high-speed railroad service.

HSR Project or Project Section: A component of the California HSR system defined by the Authority for study in an EIR/EIS, which could be implemented with functional independence building on prior sections or in connection with complementary railroad infrastructure/services. The Federal Highway Administration (FHWA, and as used in guidance from the Federal Railroad Administration (FRA)) considers *functional independence* or *independent utility* to be a usable transportation investment and "…a reasonable expenditure even if no additional transportation improvements in the area are made."[1] Project Sections are parts of the HSR System that must "connect logical termini and be of sufficient length to address environmental matters on a broad scope." [2] *Logical termini* is defined by the FHWA and FRA as the rational starting and ending points for a transportation improvement project and for review of the environmental impacts of the project.[3] Logical termini for HSR Project Sections are generally at planned passenger stations where practical train service could be provided. Alternatively, HSR Project Sections may start or end at guideway connections to complementary railroad infrastructure that enable access to the HSR improvements. In addition, the Project Section improvements and geographic extent evaluated in an EIR/EIS must not restrict consideration of alternatives for other reasonably foreseeable transportation improvements to ensure meaningful evaluation of the sections and to avoid commitments to transportation improvements before they are fully evaluated.[4]

There are currently nine approved Project Sections of the HSR System and include: San Francisco to San Jose (SF-SJ), San Jose to Merced (SJ-M), Merced to Sacramento (M-S), Merced to Fresno (M-F), Fresno

[1] Federal Highway Administration. *The Development of Logical Project Termini.* NEPA and Transportation Decision making. http://environment.fhwa.dot.gov/projdev/tdmtermini.asp Nov. 5, 1993

[2] *ibid.*

[3] *ibid.*

[4] *ibid.*

to Bakersfield (F-B), Bakersfield to Palmdale (B-P), Palmdale to Los Angeles (P-LA), Los Angeles to Anaheim (LA-A), and Los Angeles to San Diego (LA-SD). A tenth section, referred to as the Altamont Corridor, has been studied by the Authority for higher speed rail service, but which is not considered a part of the overall HSR System[5]. Each HSR section connects logical termini that, while selected at the program level of design, do not restrict project alternatives. Each of the sections has independent utility, which means each section can function as an independent transportation corridor to address environmental matters on a broad scale even if the statewide HSR system is not implemented.

HSR Project Segment: Discrete portions of the project section (e.g., north to south or east to west) that are distinguished by areas of fundamentally different geographic, community, or project characteristics (e.g., valley vs. mountain, rural vs. suburban vs. urban, main line vs. station approach/departure). Typically, segments will correspond to start and end points that are logically related to the configuration, equivalent level of evaluation and uniform comparison of alignment alternatives. Segment transition points do not necessarily correspond to locations where the alignment alternatives converge or diverge from one another within the project section. Segment transition points should be easily identifiable, physical features rather than arbitrary markers (e.g., survey or legal boundaries, engineering stationing,). The intent is to divide the project section into smaller geographic extents that help articulate regional and local conditions and context; organize presentation of lengthy end-to-end alternatives and location-based information; allow the reader to compare impacts of alternatives for a given geographic location of interest, using the same geographic segments to consistently organize location-based information; and help decision-makers work with stakeholders on specific issues related to their jurisdictions. Segments should not bias the assembly of end-to-end alternatives, which are based upon and understandably demonstrate the primary themes or rationales of the HSR project.

Alignment Alternatives: Individual railway alignments[6] to be studied within an HSR segment. Alignment alternatives are evaluated on the bases of selected engineering and environmental criteria that indicate the potential for achieving HSR program and project objectives, while avoiding or reducing potential environmental impacts. Several alignment alternatives that show engineering and environmental promise may be carried forward for further design consideration and be fully analyzed in the EIR/EIS.

Design Options: Vertical, horizontal or other design changes in a portion of a study alternative. For example, an alignment alternative could have an at-grade, aerial, subsurface or tunnel design option that might be evaluated for comparison of probable impacts.

Blended Operation: Coordinated high-speed train use of railroad infrastructure with existing intercity or commuter/regional rail systems.

Blended Service: Integrating high-speed train service with existing intercity and commuter/regional rail systems via coordinated scheduling, ticketing, and other means.

Bookends: San Francisco Bay Area and Los Angeles Basin urban sections of the overall HSR system.

One-seat ride: Passengers do not have to switch trains, even if trains operate over two systems, e.g. HSR and Caltrain system.

First Construction Segment: Madera to north of Bakersfield to be completed in 2018.

Initial Operating Segment: Initial HSR segment from Merced to Burbank Airport. Operational in 2022.

Bay to Basin: One-seat ride between San Jose and Merced to Burbank Airport with shared use of Caltrain corridor and dedicated HSR infrastructure between San Jose and Burbank Airport. Operational in 2027.

Phase I: One-seat ride between San Francisco Transbay Transit Center and Los Angeles Union Station /Anaheim through a combination of shared use of the Caltrain corridor (with track upgrades to support 30-minute travel time between San Jose and San Francisco), dedicated HSR infrastructure between San

[5] The Altamont Corridor is a separate project that would connect to the HSR System.

[6] HSR station, maintenance facility and traction system power station alternatives are also considered in EIR/EIS.

Jose and Los Angeles Union Station, and blended service with Metrolink from Los Angeles to Anaheim. Operational in 2029.

Phase 2 Full System: Full Build out of the HSR system by extending HSR service to Sacramento, San Diego, and the Inland Empire. No schedule for implementation has been adopted by the Authority.

Project Footprint: The area needed to construct, operate, and maintain all permanent HSR features (including tracks and guideway structures, train signaling and controls and communications facilities, traction power distribution and substations, switching and paralleling stations, passenger platforms and stations, maintenance-of-way facilities, maintenance facilities, HSR perimeter security controls, passenger station access, HSR facility operation or maintenance access, sound walls or other peripheral features owned and maintained by the Authority, freight or passenger or transit railroad grade separations, roadway grade separations and adjoining street or intersection changes, contiguous access to severed parcels, new utility features, existing utility relocations, access to new or relocated utility features, drainage facilities, any other physical changes within the area required to construct and operate HSR, and HSR property rights or licenses to accommodate HSR construction, operation, and maintenance (temporary and permanent ground or aerial fee properties, easements or licenses for HSR facility and associated feature sites, HSR operations and maintenance activities, operation or maintenance access, utility connections and maintenance, HSR stormwater and wildlife management features, construction activities, mobilization, staging and access).

Environmental Resource Study Area: The area in which all environmental investigations, specific to each resource type, are conducted in order to determine the resource characteristics and potential impacts of the project segment. The Environmental Resource Study Area contains all of these components: all facilities or features within the Project Footprint; the area specific to each resource or resource issue to evaluate the intensity and determine the significance of direct and indirect impacts, permanent and temporary impacts, beneficial and adverse impacts of HSR improvements and activities; the areas needed to implement, operate or maintain mitigation measures or off-site mitigation measures and mitigation sites (including relocations); and areas to identify and analyze potential secondary impacts of implementing mitigation. For cumulative impacts, the Environmental Resource Study Area also includes the geographic extent of each affected resource within which project impacts accumulate or interact with the impacts of other actions, including adjacent HSR sections.

Attachment A

Draft Program Assumptions HSR from 2014 Business Plan

Business Plan Project Description	First Year of Operation	Approximate Length of Completed HSR investment	HSR Endpoints	HSR Project Sections Cleared	Service Description
First Construction Segment	2018	130 miles of new construction	Madera to Bakersfield	Merced to Fresno and Fresno to Bakersfield	• Interim Amtrak operation of the San Joaquin service on HSR tracks between Madera and Bakersfield.[1] • Northern California Unified Service - connecting San Joaquin Rail Service, Altamont Commuter Express, Sacramento Regional Transit, the Capitol Corridor and potentially Caltrain.[1]
Initial Operating Section	2022	300 miles	Merced to Burbank Airport	Bakersfield to Palmdale, Palmdale to Burbank, and Central Valley Wye	• One-seat ride from Merced to Burbank Airport • Closes north-south intercity rail gap, connecting Bakersfield and Palmdale and then into Los Angeles Basin • Begins with construction of up to 130 miles of high-speed track and structures in the Central Valley • Private Sector operator • Ridership and revenues sufficient to attract private capital for expansion • Connects with enhanced regional/local rail for blended operations, with common ticketing

Attachment A

Draft Program Assumptions HSR from 2014 Business Plan

Business Plan Project Description	First Year of Operation	Approximate Length of Completed HSR investment	HSR Endpoints	HSR Project Sections Cleared	Service Description
Bay to Basin	2027	410 miles	San Jose and Merced to Burbank Airport	San Francisco to San Jose	• One-seat ride between San Francisco and Burbank Airport[2] • Shared use of electrified/upgraded Caltrain corridor between San Jose and San Francisco Transbay Transit Center • First HSR service to connect the San Francisco Bay Area with the Los Angeles Basin
Phase I	2029	520 miles	San Francisco Bay Area to Los Angeles/Anaheim	Los Angeles to Anaheim	• One-seat ride between San Francisco Transbay Transit Center and Los Angeles Union Station/Anaheim [2] • Dedicated HSR infrastructure between San Jose and Los Angeles Union Station • Shared use of electrified/upgraded Caltrain corridor between San Jose and San Francisco Transbay Transit Center, with track upgrades to enable 30 minute travel between San Jose and San Francisco. • Upgraded Metrolink corridor from LA to Anaheim

NOTES:
1. Interim rail operations are not part of the CHSR program.
2. One-seat ride means that passengers do not need to switch trains, even if the train operates over two systems (e.g., moving north on dedicated high-speed rail infrastructure and then moving onto Caltrain tracks at Santa Clara, assuming electrification of Caltrain corridor by 2019 as proposed by Caltrain)

Ascent Share

Helpful Information for Your Environmental Practice

Photo by USFS Region 5

Deferring Mitigation Details - No Problem, If...

Lead agencies are obligated under CEQA to adopt feasible mitigation to reduce significant environmental impacts. But what happens if the details of the mitigation are not defined? The specific details of a mitigation measure may not be known, or engineering design of measures may be too expensive to develop during CEQA review. Yet, the public seeks and deserves assurance that significant impacts will be reduced. This tension has led to several CEQA lawsuits surrounding the concept of “mitigation deferral.”

Ascent recently presented a CEQA practicum session on mitigation measures at the Association of Environmental Professionals’ State Conference in Sacramento. **The slide show from that session can be accessed here.**

Court Decisions Chart the Course

A series of court cases define the law about deferring the details of mitigation measures. Some of the cases are “classics;” four were decided within the last year. The chart below illustrates the litany of court decisions. If you **click on the chart**, it will connect you to an interactive version that will help you gain easy access to each decision through links.

(click to enlarge)

Deferral Principles are the Guideposts

Case law provides a good road map for properly deferring the details of mitigation measures, when it is not feasible to provide them during the CEQA review process. A dozen recommended principles from those decisions are presented as follows:

- Identify significant effects and commit to mitigation actions
- Don't defer adoption of mitigation commitments until further study
- Don't defer formulation of the significant aspects of mitigation until future study
- If mitigation details must be deferred, explain why they are not feasible or practical to describe now
- Describe performance criteria that deferred mitigation measure details must attain
- Don't rely just on general goals as the performance criteria
- Make performance criteria sufficiently specific to enable measurement of success
- Reliance on permits is acceptable, if you can demonstrate that reduction of the significant impact can be reasonably expected
- Offer specific examples of alternative actions that may be implemented with the deferred mitigation approach
- Explain how deferred actions will be both "feasible and efficacious" as mitigation

- Deferral of engineering design details can be acceptable, if not feasible to prepare now
- Ensure that the public has a chance to review the approach to deferring mitigation details

If you have questions or need further information, please feel free to contact Ascent principals, Curtis Alling (916.930.3181) or Sydney Coatsworth (916.930.3185). We're happy to "talk CEQA compliance" with you anytime.

Ascent Environmental, Inc. is a forward-looking environmental and natural resources consultancy. We do not practice law nor give legal advice, but rather apply our extensive CEQA experience in our environmental practice with the goal of developing defensible environmental documents. Please contact an environmental attorney, if you need legal advice on your project.

It Looks Like Mitigation. It Sounds Like Mitigation. But Can It Be Part of the Project?

Lotus v. Department of Transportation - A Practitioner's View

by Gary D. Jakobs, AICP and Curtis E. Alling, AICP

May 2014

Preface

In January 2014, the First District Court of Appeal reversed a Humboldt County Superior Court ruling and determined that the California Department of Transportation (Caltrans) did not adequately analyze the significance of a proposed highway realignment's impacts to the root systems of old-growth redwood trees in Richardson Grove State Park. Missing from the environmental impact report (EIR) were the identification of a threshold of significance regarding root zone damage and an analysis of impact significance, even though disturbance in and around the root zone of the trees was specifically described and mapped.

Confounding the omission was the inclusion in the project description of environmental protection measures the court viewed as mitigation, rather than as part of the project, which created improper short-circuiting of California Environmental Quality Act (CEQA) analytical and disclosure and requirements. The EIR described these features as "avoidance, minimization and/or mitigation measures" that "have been incorporated into the project to avoid and minimize impacts, as well as to mitigate expected impacts." However, the EIR neither addressed the significance of impacts to the root systems nor specified that the impact-reducing features were actually mitigation commitments proposed in response to a significant effect.

A few months have passed since this decision. During this time, discussion has ensued in practitioner circles about whether the decision somehow impedes the use of impact minimization and avoidance features in a project description, which has been a long-used, venerable, and effective environmental planning practice. We explore the premise further in this paper, and express the opinion that, when properly carried out, the practice of including environmentally protective features in a project description can continue, but with important caveats.

Introduction

For many years, experienced lead agencies and project applicants have incorporated "environmental protection features," or the like, into project descriptions prior to conducting CEQA impact analysis. These measures have been typically included as part of the project description and are intended to result in fewer or less severe environmental impacts. This approach may be pursued because it is good environmental planning, an expression of an agency's environmentally sensitive mission, a means to streamline the CEQA process, or all of the above. One example would be a project with a potentially significant effect caused by filling wetland habitat. During project planning or preliminary lead agency review, the proponent may, under this principle, commit to a modified project design that avoids or minimizes the filled area or to wetland habitat restoration or replacement with a specified acreage ratio and habitat quality character to compensate for unavoidable fill. Not only can the significant environmental impact be avoided when considering environmental protection features as part of the project, the cost and time necessary to prepare an EIR or mitigated negative declaration (MND) may also be reduced or avoided. At the least, under this principle, mitigation monitoring and reporting requirements can be streamlined or eliminated if, rather than

proposing mitigation measures in response to the impact analysis, identical measures are incorporated into the project description.

The Questions from *Lotus*

The 2014 decision, *Lotus v. Department of Transportation*, 223 Cal. App.4th 645, now makes us ask several questions: Is this practice permissible? If so, under what conditions? Can project descriptions be modified to avoid significant impacts, and thereby reduce CEQA documentation requirements? Can you reduce project impacts by design changes before analyzing them in a CEQA document?

There has been scant guidance on this issue up to now. Not surprisingly, then, where there is a void, the State courts are asked to fill it. In the setting of the majestic coast redwoods of Richardson Grove State Park, *Lotus v. Department of Transportation* provides some answers.

Key Facts

Caltrans proposed to realign a winding, one-mile stretch of U.S. Highway 101 to improve truck traffic safety where the highway passes through the redwood forest in the park. The park is home to old growth redwoods, some of which stand 300 feet tall and are thousands of years old. The project would not require removal of any of the old growth redwoods (although some younger trees would be removed), but would result in construction within the root zones of 74 trees ranging in diameter from 18 inches to 15 feet. According to the EIR, "About 41 redwood trees thirty inches or greater in diameter within the park would have fill placed within the structural root zone. The maximum depth of fill on these redwoods would be three and a half feet." The EIR also described the physical details of construction disturbance within the structural root zone of various sized trees in the park. The project description included design features, such as use of light-weight cement, that were intended to reduce potential environmental impacts to these majestic trees, along with non-design, impact-reducing or offsetting features. The non-design actions included use of special hand-construction techniques in the root zones, commitment to restore habitat, and implementation of invasive plant removal.

As stated in *Lotus*:

> The EIR also describes "avoidance, and minimization and/or mitigation measures" that "have been incorporated into the project to avoid and minimize impacts as well as to mitigate expected impacts." These include, "M-1: Restorative planting of 0.56 acre of former US 101 roadbed alignment…[¶] M-2: To offset the impacts to the trees where construction occurs within the structural root zone, mitigation will be provided to increase amount of invasive plant removal. A contract with the California Conservation Corps will be established to provide 300 hours a year for four years … Crew to be directed at the direction of the California Department of Parks and Recreation"… "[1] An arborist shall be present to monitor any ground disturbing construction activities. [2] All excavation below the finished grade within the setback equal to three times the diameter of any redwood tree shall be done with shovels, pickaxes, or pneumatic excavator or other methods approved by the construction engineer to minimize disturbance to or damage to the roots…"

The EIR describes, in tabular form, the type of construction activity that could occur in the root zone of each of the affected redwood trees, but does not analyze consequences to the trees or determine impact significance. Instead, the EIR relies on the incorporation of the environmental protection features into the project description to conclude that any potential impacts of the project on the trees would be less than significant (without the need for other mitigation). Importantly, the EIR includes no standards/thresholds of significance for impacts to redwoods. This is critical; without a significance threshold, there is no means by which to conclude whether impacts would or would not be significant, and findings under CEQA Section

21081 cannot be properly made (i.e., whether significant impacts are reduced to a less-than-significant level and, if so, how). The court makes it clear that thresholds were available. The court cites, for instance, the California State Parks Natural Resources Handbook (available to Caltrans during the EIR process), which describes the probability of root damage by depth and type of activity, risk to tree health, etc. The Handbook states: "Construction activities in close proximity to trees can wound or destroy tree roots, the closer the activity to the tree trunk, the higher the probability that the tree will suffer injury. This includes soil disturbance from 0 to 3 foot depth…" No thresholds of significance were included in the EIR, notwithstanding the availability of the Handbook or other criteria.

The Decision

Omitting analysis of the significance of impacts on the root zone of the redwood trees was fatal, which was the initial reason the court decided to overturn the EIR. This was the fundamental flaw of the environmental document, as demonstrated by the title of this section of the decision: *"The EIR fails to comply with CEQA insofar as it fails to evaluate the significance of the project's impacts on the root systems of old growth redwood trees adjacent to the roadway."*

In addition, the decision goes on to explain that a compounding error was the reliance on measures that were included in the project description, but should have been presented as mitigation measures in response to the identification of significant environmental effects. The court describes what constitutes mitigation under CEQA (i.e., avoiding, minimizing, rectifying, reducing, and compensating for a significant impact). In a key statement, the court says:

> As the trial court held, the "avoidance, minimization and/or mitigation measures," as they are characterized in the EIR, are not "part of the project." They are mitigation measures designed to reduce or eliminate the damage to the redwoods anticipated from disturbing the structural root zone of the trees by excavation and placement of impermeable materials over the root zones. By compressing the analysis of impacts and mitigation measures into a single issue, the EIR disregards the requirements of CEQA.

According to the court, this "short-cutting of CEQA requirements…precludes both identification of potential environmental consequences arising from the project and also thoughtful analysis of the sufficiency of measures to mitigate those consequences." CEQA requires a lead agency to consider a proposed project, evaluate its environmental impacts and, if significant impacts are identified, to describe feasible mitigation measures to reduce the impacts. The court explained: "Simply stating there will be no significant impacts because the project incorporates 'special construction techniques' is not adequate or permissible."

What Does this Mean?

Does this mean the proposed project, as initially described, cannot be refined to reduce impacts prior to the required CEQA analysis and significance findings? Has the court thrown good environmental planning out the window? Not at all. In fact, the court, in an instructive footnote, acknowledged some protective features that legitimately can be part of the project description, but stated that the line between project design and mitigation is not always clear. In this case, the use of certain lighter weight pavement base materials, which were proposed as a design feature to minimize excavation depth, reduced potential impacts to the root zone of the redwoods. The court indicated it would have been "nonsensical to analyze the impact of using some other composition of paving and then to consider the use of this particular composition as a mitigation measure." In other words, pavement material proposed to reduce excavation impacts of highway construction was a legitimate element of the project description in this circumstance.

Can environmental protection features, then, still be included in the project description for purposes of good environmental planning and impact reduction or avoidance? We believe, based on a careful reading of this decision, that a project *can* include environmental protection features in a project description, but with certain qualifications.

First, including environmental protection features in a project description does not relieve the lead agency of the obligation to adequately analyze the potential significant environmental impacts of the project, even related to the issue that a protection feature is intended to address. The CEQA document—EIR, MND, or ND—should analyze the impact, identify the relevant threshold of significance, address whether the threshold would be exceeded and why, and describe how the "environmental protection feature" would, based on substantial evidence, maintain the effect at a less-than-significant level. Also, based on the court's decision in *Lotus*, it would be important to discuss whether additional or other more effective, feasible measures would be available.

Second, an environmental protection feature must be credible as a true component of the project plan or design, rather than a mitigating action that is separate from the project itself, and responsive to the project's impacts. The distinction between project design features that protect the environment and measures that should be considered mitigation is, at times, difficult to tease out. Returning to the example of a project that includes wetland impacts, if the project plan is refined before release of a CEQA document to avoid impacts by locating all facilities outside the footprint of the wetlands, would the site plan revision be a part of the project or considered to be mitigation? We believe, in this example, the project site plan layout can legitimately be considered part of the project description. This is good project site planning. If it avoids wetland fill, the environmental analysis would conclude that the proposed project, as designed, would not adversely affect the wetland. Alternatively, what if the wetland is occupied by an endangered species that relies on both the wetland and surrounding upland, but impacts to the species could be avoided by monitoring construction activities, installing a barrier, capturing and relocating individuals of the species, or restoring nearby habitat? Our view is that these are special actions that meet the definition of mitigation measures and are arguably not a part of the basic project. Unlike facility location, layout, or design, these measures involve more than adhering to a site plan or project design; they are special actions needed to limit the degree and magnitude of the project impacts or compensate for them. Further, these measures would each need to be analyzed for effectiveness in reducing the impact and a mitigation monitoring or reporting plan would need to be adopted.

Other Circumstances Not Covered In *Lotus*

The *Lotus* decision addressed a specific set of facts, but it did not answer all the questions about the practice of employing environmental protection features in a project description. Between the ends of the conceptual spectrum of (1) a clearly legitimate component of a project plan or design and (2) an obvious mitigation measure, such as a compensatory action or special impact-reducing action in response to a significant impact, is the gray area of other concepts and fact-situations. For instance, highly standardized, environmentally protective, construction practices are often included as part of project implementation, i.e., "best management practices," or "BMPs." BMPs are often prescriptive and sufficiently standardized to be generally applicable, not requiring special tailoring to a project situation. Another common example of the use of environmental protection features in a project description is the "self-mitigating" community or resource management plan, e.g., a city or county general plan, state park general plan, or wildlife area land management plan. They can contain environmentally protective refinements in planning policies and implementing actions that are included to avoid significant effects.

These are important examples of common practices that are not specifically addressed by *Lotus*. We believe that there may be room to include standardized measures required by law or regulation in the project description and environmentally protective policies and actions in a proposed plan; however, we do not

believe this eliminates the obligation to evaluate potential environmental effects and whether the project measures effectively reduce significance impacts.

Perhaps, these are lingering voids in CEQA guidance to be filled by the court another day…

Practice Pointers

In short, if an environmental protection feature modifies physical elements of a project, as expressed in its site plan or design, we believe it is permissible (and good environmental planning) to include the feature as part of the project description. Therefore, the significance determination would take into account the environmental protection afforded by that feature.

In response to the *Lotus v. Department of Transportation* decision, if an environmental protection action is not a feature described in the project plan or design and it meets the definition of a mitigation measure, it likely is one. The environmental analysis of a significant impact of a proposed project would not, then, assume the mitigation measure is already part of the project description. The mitigation measure's impact-reducing influence would be considered after an initial conclusion describing the proposed project's significant or potentially significant effect on the environment.

Regardless, the relevant environmental impact needs to be evaluated and disclosed. The analysis needs to include a threshold or standard of significance and the identified project description feature or mitigation measure (whichever it may be) must be evaluated for its effectiveness in reducing the impact.

As it has been said, "if it looks like a duck, and quacks like a duck, it is a duck."

If you have any questions about this paper, please feel free to contact either of the authors:

Gary D. Jakobs, AICP
Principal
Ascent Environmental, Inc. – Sacramento
916.930.3182
gary.jakobs@ascentenvironmental.com

Curtis E. Alling, AICP
Principal
Ascent Environmental, Inc. – Sacramento
916.930.3181
curtis.alling@ascentenvironmental.com

APPENDIX E: MITIGATION MONITORING AND ENFORCEMENT PLAN

Introduction

Impact avoidance and minimization features (features) and mitigation measures (measures) that would reduce, eliminate, or avoid significant adverse environmental impacts associated with the High-Speed Rail (HSR) Project are identified in the environmental impact report/environmental impact statement (EIR/EIS) prepared for each HSR section. Features are derived from the program-level environmental documents and subsequent project planning and design. Measures are developed in coordination with resource agencies, local agencies, and stakeholders.

The Findings of Fact and Statement of Overriding Considerations under the California Environmental Quality Act (CEQA) and the Record of Decision (ROD) under the National Environmental Policy Act (NEPA) identify the features that have been integrated through project design/specification and measures that have been adopted and have received lead agency commitment to implement, monitor, and enforce. CEQA and NEPA require that a lead agency establish a program to monitor, report, and enforce implementation of mitigation measures adopted as part of the environmental review process. The Federal Railroad Administration (FRA) is the lead agency for the HSR project.

A Mitigation Monitoring and Enforcement Plan (MMEP) must be adopted when the California High-Speed Rail Authority (Authority) commits to carrying out each HSR project to meet the requirements of both CEQA and NEPA. The MMEP ensures that features to avoid or minimize impacts and measures to mitigate significant environmental impacts that are identified in the final environmental document are fully implemented by the project in the appropriate design, pre-construction, construction, and post-construction timeframes. The MMEP accompanies the Authority's certification of each EIR/EIS, as well as FRA's ROD, and commits the Authority to implementation of impact avoidance, minimization, or mitigation.

The MMEP is a practical guide for the implementation of specific features or measures for the selected alignment (preferred alternative) and documentation of the impact avoidance, minimization, or mitigation outcomes. The MMEP shall:

- State the purpose of the document, outlining the intention to satisfy the requirements of CEQA and NEPA, comply with regulatory laws, meet expectations for performance from the EIR/EIS, and guide avoidance, minimization, or mitigation implementation
- Define terminology used throughout the plan, including project phases and types of documentation
- Relate the resource impact(s) to be mitigated with the impact avoidance or minimization features or mitigation measures contained in the Final EIR/EIS, as identified in the ROD
- Identify responsible entities (e.g., Authority, contractor, regulatory agency, municipality) and roles (e.g., implementation, monitoring, reporting, funding) for carrying out the avoidance, minimization, or mitigation action(s)

Introduce the MMEP by explaining the content and function of the plan, including a statement that the Authority may refine the means by which it will implement a feature or measure, as long as the alternative means ensure compliance during project implementation and do not result in new significant adverse impacts. Describe implementation and monitoring procedural guidance, responsibilities, and timing for each feature or measure identified in the EIR/EIS. Present the working details of the MMEP as a table, created in Microsoft Excel and converted to Adobe PDF when final, including:

- Impacts that are avoided or minimized
- Significant impacts the mitigation seeks to lessen or avoid

- Mitigation measures used to lessen or avoid the impacts
- Entities or roles responsible for implementation of the features or measures
- Timing and means of implementing features or measures and documentation

Laws, Regulations, and Orders

Prepare the MMEP pursuant to federal law described below. Design the MMEP to provide the features and measures, develop monitoring evidence, and report actions to simultaneously satisfy the requirements of state law.

Federal

National Environmental Policy Act

40 C.F.R. Section 1508.20 defines Mitigation as:

> *(a) Avoiding the impact altogether by not taking a certain action or parts of an action. (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation. (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment. (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action. (e) Compensating for the impact by replacing or providing substitute resources.*

40 C.F.R. Section 1505.2[1] prescribes the preparation of the MMEP per the ROD:

> *At the time of its decision (§1506.10) or, if appropriate, its recommendation to Congress, each agency shall prepare a concise public record of decision. The record, which may be integrated into any other record prepared by the agency, including that required by OMB Circular A-95 (Revised), part I, sections 6(c) and (d), and part II, section 5(b)(4), shall:(a) State what the decision was. (b) Identify all alternatives considered by the agency in reaching its decision, specifying the alternative or alternatives which were considered to be environmentally preferable. An agency may discuss preferences among alternatives based on relevant factors including economic and technical considerations and agency statutory missions. An agency shall identify and discuss all such factors including any essential considerations of national policy which were balanced by the agency in making its decision and state how those considerations entered into its decision. (c) State whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted, and if not, why they were not. A monitoring and enforcement program shall be adopted and summarized where applicable for any mitigation.*

State

California Environmental Quality Act (Cal. Public Res. Code, § 21081.6)

> *(a) When making the findings required by paragraph (1) of subdivision (a) of Section 21081 or when adopting a mitigated negative declaration pursuant to paragraph (2) of subdivision (c) of Section 21080, the following requirements shall apply: (1) The public agency shall adopt a reporting or monitoring program for the changes made to the project or conditions of project approval, adopted in order to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance during project implementation. For those changes which have been required or incorporated into the project at the request of a responsible agency or a public agency having jurisdiction by law over natural resources affected by the project, that agency*

[1] Code of Federal Regulations / Title 40 - Protection of Environment / Vol. 34 / 2012-07-01992

shall, if so requested by the lead agency or a responsible agency, prepare and submit a proposed reporting or monitoring program. (2) The lead agency shall specify the location and custodian of the documents or other material which constitute the record of proceedings upon which its decision is based. (b) A public agency shall provide that measures to mitigate or avoid significant effects on the environment are fully enforceable through permit conditions, agreements, or other measures. Conditions of project approval may be set forth in referenced documents which address required mitigation measures or, in the case of the adoption of a plan, policy, regulation, or other public project, by incorporating the mitigation measures into the plan, policy, regulation, or project design. (c) Prior to the close of the public review period for a draft environmental impact report or mitigated negative declaration, a responsible agency, or a public agency having jurisdiction over natural resources affected by the project, shall either submit to the lead agency complete and detailed performance objectives for mitigation measures which would address the significant effects on the environment identified by the responsible agency or agency having jurisdiction over natural resources affected by the project, or refer the lead agency to appropriate, readily available guidelines or reference documents. Any mitigation measures submitted to a lead agency by a responsible agency or an agency having jurisdiction over natural resources affected by the project shall be limited to measures which mitigate impacts to resources which are subject to the statutory authority of, and definitions applicable to, that agency. Compliance or noncompliance by a responsible agency or agency having jurisdiction over natural resources affected by a project with that requirement shall not limit the authority of the responsible agency or agency having jurisdiction over natural resources affected by a project, or the authority of the lead agency, to approve, condition, or deny projects as provided by this division or any other provision of law.

Identifying Relevant Features and Measures

Impact features and measures are included in the development of the draft EIR/EIS [40 C.F.R. Section 1502.14(f)] for each proposed alignment and its associated impacts. The final EIR/EIS presents measures to mitigate the significant adverse impacts of the selected Preferred Alternative. Include only those features and measures relevant to the Preferred Alternative in the MMEP.

Developing Mitigation for the MMEP

The MMEP presents the practical framework for implementing features and measures in the EIR/EIS. Features or measures in the MMEP may be revised to be feasible and practical, as long as revisions do not have a negative impact on the measure’s efficacy or result in new significant adverse impacts, and comply with the requirements of regulatory permits.[2] Responsibility for carrying out features and measures may also be refined to reflect project delivery contract models, realistic levels of effort, and staffing plans as long as the effectiveness of technical specialists is not diminished. Features and measures must identify methods and time schedules for the delivery of reports that document compliance with the MMEP.

Features and measures must identify an objective, plan for implementation, agency or person(s) responsible for implementation, and timing and reporting of implementation.

[2] Changes to mitigation measures that are conditions of regulatory permit approvals may trigger formal amendment of affected permits and the potential need for recirculation of related sections of the EIR/EIS.

Identifying Roles and Responsibilities for Implementation

Final design and construction for HSR project sections will occur through Design-Build procurement and project delivery. Consider the Design-Build approach when identifying roles and responsibilities for implementation of features and measures. There are two entities that are primarily responsible for implementing features and measures: the Authority and the Design-Build contractor (Contractor) hired to deliver the project with Authority oversight. Third parties, such as local jurisdictions and agency partners, may also be responsible for implementing certain features or measures. The Contractor will provide qualified technical specialists responsible for implementing, documenting, and reporting on features and measures.

Authority responsibilities include:

- All measures specific to operations
- Features or measures intended to be implemented prior to receipt of environmental permits or the Notice to Proceed
- All offsite mitigation

Contractor responsibilities include all features and measures specific to construction-related activities such as:

- Clearing and grubbing
- Ground disturbance
- Material hauling
- Guideway system and other facility construction
- Site restoration (where applicable)

Shared responsibilities include:

- Features or measures requiring both immediate and long-term action (e.g., immediate implementation and long-term monitoring of a reseeding program for a duration of 5 years)
- Features or measures to be implemented by third parties (e.g., joint partnerships with municipalities, utilities, Caltrans, railroad operators, and management districts)

Identifying Appropriate Documentation and Enforcement

Enforcement mechanisms are necessary to document how features and measures will be implemented. These mechanisms are identified in the MMEP and can take a number of different forms. Often, provisions will be included in the final design/construction contract requiring the contractor to implement features and measures. Agreements with third parties can also be used as enforcement mechanisms. Identify an enforcement or implementation mechanism for all features and measures and deploy these mechanisms consistently throughout the MMEP.

Formatting the MMEP for Implementation and Document Delivery

Provide two products to document and implement the MMEP: (1) an MMEP formatted for publication and (2) data derived from the MMEP for use by the HSR implementation tracking system.

MMEP Document Outline

Prepare the MMEP in four sections:

- Section 1: Introduction, Background, Purpose, Legal Authority, Implementation and Enforcement, and other explanatory text.

- Section 2: Mitigation Measure Table, as illustrated by Table 1. Use this design for all published MMEP documents in all HSR project sections. Prepare the Mitigation Measure Table as an Excel spreadsheet, formatted for easy reading and publication.
- Section 3: Avoidance and Minimization Feature Table, as illustrated by Table 2. Prepare the Avoidance and Minimization Feature Table as an Excel spreadsheet, formatted for easy reading and publication.
- Section 4: An MMEP data import tool, as illustrated by Tables 3 and 4, consisting of two Excel spreadsheets. While organized differently, the Mitigation Measure and the Avoidance and Minimization Feature Tables and the data import spreadsheets contain the same information.

MMEP Data Import Tool Specifications

Implementation of the features and measures provided in the MMEP will be tracked using a digital database called EMMA (Environmental Mitigation Management and Assessment). Provide two Excel spreadsheets to populate EMMA with features, measures, associated impacts, and implementation details.

- Compile data for features and measures in one spreadsheet and compile data for the associated impacts in another spreadsheet. Table 2 and Table 3 provide examples of these spreadsheets.
- Do not use rich text (web links, font styling, etc.).
- Do not merge cells.
- Use one line for each feature or measure (no repeating features or measures).
- Create one Import Tool per Construction Package.
- List multiple values as comma-delimited.
- Do not include formulas in cells.
- Header rows can be a single line with no formatting.
- Do not lock header rows or freeze panes.
- Avoid using forward and back slashes throughout the spreadsheets.

Table 1: Mitigation Measure Table (example only)

Mitigation Measure	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Reporting Schedule	Implementation Mechanism	Impact #	Impact Text
AQ-MM#1	Reduce Criteria Exhaust Emissions from Construction Equipment	This mitigation measure will apply to heavy-duty construction equipment used during the construction phase. All off-road construction diesel equipment will use the cleanest reasonably available equipment (including newer equipment and/or tailpipe retrofits), but in no case less clean than the average fleet mix, as set forth in CARB's Non-Road/Off-Road 2007 database. The contractor will document efforts it undertook to locate newer equipment (such as, in order of priority, Tier 4, Tier 3 or Tier 2 equipment) and/or tailpipe retrofit equivalents. The contractor shall provide documentation of such efforts, including correspondence with at least two construction equipment rental companies. A copy of each unit's certified tier specification and any required CARB or SJVAPCD operating permit will be made available at the time of mobilization of each piece of equipment. The contractor shall keep a written record (supported by equipment hours meters where available) of equipment usage during project construction for each piece of equipment.	Construction	Reporting	Weekly	Contractor	Contractor	Daily Record Keeping and Weekly Reporting	A copy of each unit's certified tier specification and any required California Air Resources Board (CARB) or San Joaquin Valley Air Pollution Control District (SJVAPCD) operating permit will be made available at the time of mobilization of each piece of equipment.	AQ#1	Regional Impacts: Construction of the HSR alternatives would exceed the CEQA emissions thresholds for volatile organic compound (VOC) and nitrogen oxide (NO_x). Therefore, it could potentially cause violations of nitrogen dioxide (NO_2) and ozone (O_3) air quality standards or contribute substantially to NO_2 and O_3 existing or projected air quality violations
										AQ#3	Compliance with Air Quality Plans: Construction of the HSR alternatives would exceed the CEQA emissions thresholds for VOC and NO_x. Therefore, it would conflict with the 1-hour Ozone Attainment Plan and the 8-hour Ozone Attainment Plan.
AQ-MM#2	Reduce Criteria Exhaust Emissions from On-Road Construction Equipment	This mitigation measure applies to on-road trucks used to haul construction materials, including fill, ballast, rail ties, and steel. Material hauling trucks will consist of an average fleet mix of equipment model year 2010 or newer, to the extent reasonably practicable. The contractor shall provide documentation of efforts to secure such fleet mix inclusive of its sub-contractors. The contractor and its sub-contractors shall keep a written record of equipment usage during project construction for each piece of equipment.	Construction	Reporting	Weekly	Contractor	Contractor	Weekly reporting	Contract Requirement Specifications	AQ#1	Regional Impacts: Construction of the HSR alternatives would exceed the CEQA emissions thresholds for volatile organic compound (VOC) and nitrogen oxide (NO_x). Therefore, it could potentially cause violations of nitrogen dioxide (NO_2) and ozone (O_3) air quality standards or contribute substantially to NO_2 and O_3 existing or projected air quality violations
										AQ#2	Regional Impacts: Material hauling outside the SJVAB would exceed CEQA emission thresholds for NO_x in the Bay Area Air Quality Management District (AQMD), East Kern APCD, Mojave Desert AQMD, and the SCAQMD for certain hauling scenarios. Therefore, it could potentially cause violations of NO_2 and O_3 air quality standards or contribute substantially to NO_2 and O_3 existing or projected air quality violations in those air districts.
										AQ#3	Compliance with Air Quality Plans: Construction of the HST alternatives would exceed the CEQA emissions thresholds for VOC and NO_x. Therefore, it would conflict with the 1-hour Ozone Attainment Plan and the 8-hour Ozone Attainment Plan.

Table 2: Avoidance and Minimization Feature Table (example only)

Avoidance and Minimization Feature	Title	Mitigation Text	Phase	Implementation Action	Reporting Schedule	Implementation Party	Reporting Party	Reporting Schedule	Implementation Mechanism	Impact #	Impact Text
Bio-AM#1	Hydromodifi-cation Management	Maintain water quality by using infiltration systems, detention systems, retention systems, constructed wetland systems, filtration systems, biofiltration/bioretention systems, grass buffer strips, ponding areas, organic mulch layers, planting soil beds, sand beds, and vegetated systems such as swales and grass filter strips that are designed to convey and treat either fallow flow (swales) or sheetflow (filter strips) runoff.	Construction	Reporting	Weekly	Contractor	Contractor	Daily Record Keeping and Weekly Reporting	Permit Condition	Bio#17	Construction of the HST would have indirect impacts on jurisdictional waters
NV-AM#1	Construction Truck Routes	Deliver all construction-related equipment and materials on the appropriate truck routes. Prohibit heavy-construction vehicles from accessing the site via other routes.	Construction	Reporting	Monthly	Contractor	Contractor	Monthly Reporting	Management Plan and Reporting	NV#1	Construction Noise
										NV#2	Construction Vibration

Table 3: MMEP Data Import Tool (example only)

Measure or Feature	Title	Abr. MM Title	Mitigation Text	Phase	Implementation	Reporting Schedule	Implementation Party	Monitoring and Reporting Party	Implementation Text	Implementation Mechanism	Impacts
AQ-MM#1	Reduce Criteria Exhaust Emissions from Construction Equipment	Reduce Constr. Equipment Emissions	This mitigation measure will apply to heavy-duty construction equipment used during the construction phase. All off-road construction diesel equipment will use the cleanest reasonably available equipment (including newer equipment and/or tailpipe retrofits), but in no case less clean than the average fleet mix, as set forth in CARB's Non-Road/Off-Road 2007 database. The contractor will document efforts it undertook to locate newer equipment (such as, in order of priority, Tier 4, Tier 3 or Tier 2 equipment) and/or tailpipe retrofit equivalents. The contractor shall provide documentation of such efforts, including correspondence with at least two construction equipment rental companies. A copy of each unit's certified tier specification and any required CARB or SJVAPCD operating permit will be made available at the time of mobilization of each piece of equipment. The contractor shall keep a written record (supported by equipment hours meters where available) of equipment usage during project construction for each piece of equipment.	Construction	Reporting	Weekly	Contractor	Contractor	Daily Record Keeping and Weekly Reporting	A copy of each unit's certified tier specification and any required California Air Resources Board (CARB) or San Joaquin Valley Air Pollution Control District (SJVAPCD) operating permit will be made available at the time of mobilization of each piece of equipment.	AQ#1, AQ#2
NV-AM#1	Construction Truck Routes		Deliver all construction-related equipment and materials on the appropriate truck routes. Prohibit heavy-construction vehicles from accessing the site via other routes.	Construction	Reporting	Monthly	Contractor	Contractor	Prepare plans establishing appropriate truck routes and report on enforcement of route use	Management Plan and Reporting	NV#1, NV#2

Note: Mitigation Measures and Avoidance and Minimization Features may be captured within a single Data Import Tool spreadsheet.

Table 4: MMEP Data Import Tool—Impacts (example only)

Impact #	Impact Title
AQ#1	Regional Impacts: Construction of the HST alternatives would exceed the CEQA emissions thresholds for volatile organic compound (VOC) and nitrogen oxide (NO_x). Therefore, it could potentially cause violations of nitrogen dioxide (NO_2) and ozone (O_3) air quality standards or contribute substantially to NO_2 and O_3 existing or projected air quality violations

APPENDIX F: UPDATED ENVIRONMENTAL METHODOLOGY GUIDELINES FOR REGIONAL GROWTH ESTIMATES FOR LONG-TERM EMPLOYMENT AND POPULATION INCREASES

Memorandum

DATE: February 14, 2017

TO: Bryan Porter, RDP Environmental Program Manager

FROM: Ira Hirschman, WSP | Parsons Brinckerhoff

CC: Lisa Nungesser, RDP Deputy Director for Environmental Planning

SUBJECT: Updated Environmental Methodology Guidelines for Regional Growth Estimates for Long-Term Employment and Population Increases

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This memorandum describes the updated methodologies to be used to calculate long-term employment and population increases discussed in Section 3.18 Regional Growth of the California High-Speed Rail (CHSR) section environmental impact report/environmental impact statements (EIR/EIS). The discussion reviews the literature related to long-term employment growth, especially as it relates to employment increases in the region associated with increased transportation accessibility between the region and the Bay Area and the Los Angeles Basin. A methodology is also presented to estimate the increase in regional population as a result of direct, indirect, and induced employment growth. Although this memorandum is organized as a freestanding document, the methodologies described will be used to update the California High-Speed Rail Authority (CHSRA) *Environmental Methodology Guidelines* (version 5).

Employment growth impacts of the Project's sections estimated by the EIR/EIS regional consultants should be those stemming from three primary sources: the initial construction phase, the operations and maintenance (O&M) phase on an ongoing, annual basis, and from the economic growth effects associated with improvements to accessibility. The recommended approach to estimating these three sources of employment growth is documented in the following sections. The approach to estimating employment impacts resulting from construction and O&M activities is generally straightforward in terms of economic analysis and use of the Bureau of Economic Analysis' (BEA) Regional Input-Output Modeling System (RIMS II) to costs associated with construction and O&M activities. This approach is in line with industry standard practices for economic impact analysis and will ensure that EIR/EIS methodologies will be acceptable and consistent across all sections. However, analysis of potential employment impacts from improved transportation accessibility is more involved and requires more detailed explanation below. Forecast population is based on the estimated employment increases.

Employment Impacts from Construction

The total employment impacts of construction spending, including direct spending *and* indirect plus induced multiplier effects, should be estimated by the EIR/EIS regional consultant for the anticipated construction period based on BEA RIMS II Final Demand employment multipliers. For the EIR/EIS, a customized set of multipliers should be procured from BEA to reflect the area of potential regional impacts for the given EIR/EIS section.

One important caveat should be noted: The customized multipliers obtained from the BEA will be adjusted to remove economic impacts that would occur beyond the counties that comprise the region evaluated for each EIR/EIS section. These external impacts or "economic leakages" are defined as intermediate purchases made by businesses or consumer purchases by individuals who are located in the constituent counties, *from* business located in counties *outside* the regional area. These outside

purchases can include spending in other California counties or in locations outside the state entirely. As such, the EIR/EIS section's construction economic impact analysis excludes impacts that would occur outside of the regional area yet would benefit the State of California as a whole. Because of this adjustment procedure (for which there is no corresponding adjustment for outside spending into the regional area), the total employment impacts estimated for each EIR/EIS section region, if summed across all EIR/EIS sections, would be less than total economic impacts to the state of California and to the U.S. as a whole thus somewhat understating the overall economic impacts of construction spending.

Employment Impacts from Operations and Maintenance

The total employment impacts associated with spending during the operations and maintenance of the CHSR system would similarly include direct, indirect, and induced employment effects that should be estimated by the EIR/EIS regional consultant for the anticipated year when operation would begin. Again, the estimation of the economic impacts should be based on BEA RIMS II Final Demand employment multipliers customized to reflect the area of potential regional impacts for the given EIR/EIS section.

System-wide O&M cost impacts may be allocated to a given EIR/EIS section based on right-of-way miles in each section, or other allocation variables that may be deemed more appropriate to actual service patterns.

The discussion of potential long-term economic impacts should also discuss the context of anticipated employment increase. Analysis has previously been conducted to estimate system-wide employment demand statewide and by larger geographic regions, e.g., the six counties of the Central Valley. The current estimate for Phase 1 is presented in the most recent business plan, *Connecting and Transforming California, 2016 Business Plan* (CHSRA, 2016). This estimate captures the economic impacts that would occur beyond the counties that comprise the region evaluated for each EIR/EIS section.

Long-Term Employment Impacts from Accessibility Improvements

Overview

To estimate impacts from increased transportation accessibility, a methodology was developed resulting in a range of estimates of the possible long-term employment increases resulting from the project (Blended System), which may be seen by the year 2050. The horizon year 2050, rather than 2040, was selected to fully capture all of the employment increases tied to increased accessibility, but calculations using 2040 data would be only slightly less. The analysis is based on a review of available research literature related to the long-term economic impacts of high-speed rail on local, regional, and national economies. The focus was on identifying studies that sought to evaluate impacts due to accessibility improvements, which can result in long-term dynamic economic effects such as enhanced labor market accessibility, increased business travel and transactions, direct transport cost savings, improved business and worker productivity, support of tourism and other important service sectors requiring patron accessibility, etc.

A comprehensive summary of the literature and issues related to the wider effects of high-speed rail on economic activity was prepared as part of the *Building California's Future, Revised 2012 Business Plan* (CHSRA, 2012); the reader is referred to the supporting *Economic Impact Analysis Report* (CHSRA, 2012). Other research summaries are also available in the literature, and some of these can be found in the listed source materials.

A range of impact “factors” were found in the literature, including elasticities of employment with respect to accessibility, and employment ratios for service indicators such as corridor length (e.g., jobs per corridor mile) and rail service density. Employment forecasts were made by applying the factors to estimates of accessibility improvements (in the case of accessibility elasticities), and to the approximately 800-mile Bay to Basin corridor length (in the case of employment per corridor mile ratios). The calculations yielded a range of 2050 forecasts from a low of about 52,000 additional permanent jobs to a high of about 189,000 jobs. In fact, the results are grouped at the low end and the high end of the range, depending on whether the approach utilized jobs per corridor mile (lower impact forecasts) and accessibility elasticities (the high impact forecasts). At the high end of the range, the potential impacts

would represent a significant gain in statewide employment – presently, total California employment statewide is approximately 16 million, and the CHSR service area is home to about 10.6 million jobs; by 2050, projected growth of 1.1% per year for the CHSR service area would yield a baseline employment figure of about 15.4 million; total state employment would reach about 23 million in 2050 at that same growth rate.

As a result, a mid-range forecast is proposed for EIR/EIS purposes between the median values of the two methods (i.e., the median value of estimates using the elasticity approach and the median value using the corridor distance approach). The mid-range calculation yields a gain of about 102,000 jobs over and above the baseline economic/employment forecast for the State of California by 2050. This would represent about a 0.44% gain in employment statewide in 2050, relative to 2050 employment without the project.

In addition to the corridor-wide estimate, methodology recommendations for apportioning the statewide result to individual EIR/EIS sections also are provided.

Based on the literature review, however, the wider economic effects of a major transportation investment of the magnitude of the CHSR system are clearly quite complex, driven by a multiplicity of factors, some known and others unanticipated, and the applicability of findings from other research to the CHSR system are at most illustrative. Accordingly, these forecasts should be understood as workable assumptions for EIR/EIS purposes. They are not derived from rigorous analysis or modeling of the California economy with and without the CHSR system in place. Changes in project definition and economic conditions reaching well into the future can greatly affect long-term employment effects, and no claim of accuracy of the EIR/EIS forecast assumption is made.

General Methodology in the Literature

The basic approach taken was to identify economic effects (typically in the form of accessibility-employment elasticities, or jobs per corridor mile of high-speed rail), and apply these to estimated accessibility impacts in the case of the former, and to the approximately 800-mile Blended System corridor length in the latter case. Employment-accessibility elasticities are defined as the percentage increase in permanent jobs for a 1% increase in accessibility. The process is shown graphically below.

1) Accessibility

Employment Accessibility Elasticity X **% Change in Accessibility** X **No Build Statewide Employment** = **Employment Increase vs. No Build**

2) Corridor Miles

Jobs per Corridor Mile X **Corridor Miles** = **Employment Increase vs. No Build**

As noted, two primary types of impact measures that can be applied in this methodology were identified: permanent jobs per corridor mile, and employment-accessibility elasticities, measuring the percentage increase over and above no-build employment for a service region for a given percentage improvement in accessibility. The recommended methodology includes estimates made using both approaches, and finds a mid-range employment impact.

Findings

The forecast results for the Blended System are described below, including the development of accessibility increase values, other input assumptions, and the results. The process involved surveying the available research literature relating to the long-term economic impacts of high-speed rail in various

locations in the U.S. and abroad, and applying average accessibility elasticity values to estimated changes in accessibility associated with the rail system. In addition to employment-accessibility elasticities, estimates have also been made of employment based on corridor length, as described in the general methodology section above.

Table 1 below presents the derivation of accessibility increase percentages from CHSR for the state as a whole. These estimates have been based on a previous analysis conducted to support the ongoing CHSRA's EIR/EIS work.

Table 1 – Accessibility Increase Analysis

2050 Accessibility Increase Calculations (120 minute time bands)							
from Table B.7				from Table B.8			
Job access (120 minute time bands)				Labor market access (120 minute time bands)			
County	jobs, 10^3 (1)	% change by county in accessibility (2)	job weighted accessibility increase scores	County	people, 10^3 (1)	% change by county in accessibility (2)	population weighted accessibility increase scores
Kern	3,240	27.0%	0.0058	Fresno	7,902	44.0%	0.0102
Fresno	2,924	49.0%	0.0094	Kern	8,457	29.0%	0.0072
Kings	2,403	25.0%	0.0040	Kings	6,521	25.0%	0.0048
Madera	2,262	16.0%	0.0024	LA Basin	23,753	1.0%	0.0007
San Benito	5,875	13.0%	0.0050	LA North	20,394	1.0%	0.0006
Santa Clara	6,348	7.0%	0.0029	Madera	6,489	10.0%	0.0019
Santa Cruz	4,781	4.0%	0.0013	Merced	8,205	5.0%	0.0012
Stanislaus	5,982	2.0%	0.0008	Monterey	6,445	6.0%	0.0011
Tulare	1,939	3.0%	0.0004	San Benito	12,754	15.0%	0.0056
LA Basin	10,888	1.0%	0.0007	Santa Clara	13,869	7.0%	0.0028
LA North	9,429	2.0%	0.0012	Santa Cruz	9,775	4.0%	0.0011
Merced	3,333	4.0%	0.0009	Stanislaus	13,164	1.0%	0.0004
La- San Fernando	10,534	0.2%	0.0001	Tulare	5,321	4.0%	0.0006
Alameda	6,998	0.0%	0.0000	La- San Fernando	23,148	0.3%	0.0002
San Mateo	5,980	0.2%	0.0001	Orange	25,965	0.0%	0.0000
Monterey	3,064	6.5%	0.0013	Riverside	21,529	0.0%	0.0000
San Francisco	6,050	0.0%	0.0000	Sacramento	10,860	0.0%	0.0000
Orange	11,715	0.0%	0.0000	San Bernardino	23,368	0.0%	0.0000
Riverside	9,105	0.0%	0.0000	San Diego	14,201	0.0%	0.0000
San Bernardino	9,907	0.0%	0.0000	San Francisco	12,902	0.0%	0.0000
San Joaquin	6,964	0.0%	0.0000	San Joaquin	15,320	0.0%	0.0000
San Diego	6,338	0.0%	0.0000	Alameda	15,049	0.15%	0.0001
Sacramento	4,743	0.0%	0.0000	San Mateo	12,654	0.1%	0.0000
All other counties	10,831	0.0%	0.0000	All other counties	24,129	0.0%	0.0000
State total	151,633	weighted avg. increase	3.6%	State total	342,174	weighted avg. increase	3.8%

Source: Cambridge Systematics, April 2015.

The previous study included analysis of the changes in accessibility for counties in California resulting from the CHSR Blended System. Accessibility impacts are measured based on increases in travel time "contours" across two dimensions: access to labor markets and access to places of employment. For example, a gain in access to labor resulting from better access and reduced travel time would be measured by the increase in the size of the labor force available to a given county within a 120 minute travel time. Accessibility increases are obtained from Tables B-7 and B-8 of the cited report. For purposes of this assessment, the 120 minute time contours were considered, as they provide the broadest possible measure of accessibility for the CHSR system, which will provide access not only for labor markets but for intercity travel.

Counties experiencing accessibility increases are shown in Table 1; many counties throughout the state would experience no gains in accessibility, as measured by the 120 minute contours, and those are indicated in the table as having 0% change. To calculate the overall corridor-wide accessibility gains for labor and employment access, the percentage accessibility increases for each county experiencing a gain were weighted by the share of the statewide total for labor and employment for the individual counties represented. The total weighted average gains are shown in yellow in the table, and an average gain across both measures was used as the summary increase in corridor wide accessibility due to the CHSR Blended System. Note that the 2050 employment and labor force estimates for 2050 are considerably higher than today.

It should be noted that the accessibility measures available from the previous work are imperfect, and do not capture the important accessibility gains from enhanced connectivity between the Bay Area and the Los Angeles Basin, which are outside the two hour trip time, nor does it capture accessibility provided from the major airports, and to and from major tourist destinations throughout the corridor. Measuring accessibility is not straightforward, and there is a large literature on the subject, which reveals the wide variability in approaches to quantifying accessibility. Other key inputs to the analysis are highlighted in Table 2 below.

Table 2 – Service Factor and Economic Input Values

CHSR corridor wide economic factors			
		2015	2050 projected
Accessibility	pct change		3.7%
corridor miles	miles		800
California GDP (2015) $M	millions 2015 $	2,448,467	4,122,928
HSR service area employment (M) (estimated share)	millions 2015	12	20.2
Employment - populaton ratio	ratio	2.257	2.257
assumed annual economic growth rate	annual rate through 2050		1.5%

Sources: BEA, 2013; Cambridge Systematics, April 2015.

The results of the analysis are summarized in Table 3 below. The table shows various literature sources and the impact measures derived in those other studies. As noted, only the accessibility elasticities and the jobs per corridor impacts were used in this analysis – other studies looked at other impact measures, such as rail service density-employment elasticities, but these were determined to be too few to draw conclusions, and the measures of transportation impact such as rail service density were not straightforward to measure or necessarily relevant to a long high-speed rail corridor.

As seen in Table 3, three individual studies that estimated impacts of high-speed rail on Gross Domestic Product (GDP) or Gross Regional Product were applied to derive employment impacts (highlighted in blue). Within the GDP effects category, measures of employment-accessibility and jobs per corridor mile were found in the literature. In the case of one study which derived GDP per corridor mile, it was necessary to convert changes in GDP to employment based on the most current employment to GDP ratio for California.

Two other studies found impacts of accessibility on productivity (highlighted in beige). Here again, it was necessary to convert a productivity elasticity to an employment elasticity using an employment to GRP ratio (in percentage terms, GRP changes were considered a reasonable proxy for productivity changes).

Table 3- Summary of Statewide Employment Increases Based on Individual Research Findings

Summary of HSR Economic Impact Effects Literature										
		Transportation impact/service measure								Employment Differential vs. Baseline for CHSR
Economic Effects	Reference Source	Rail Service Miles Density (elasticity)	per Corridor Mile	Accessibility (elasticity)	notes on referenced study	CA specific employment adjustment factors		implied (derived) employment impact		2050
								employment-accessibility elasticity	employment / corridor mile	yearly permanent employment equivalent
GDP/GRP	Vickerman (1987)			range, 0.1 - 0.3	estimate for Chunnel, impacts in metro areas	employment - GRP ratio	0.0000074	0.2		151,155
	Chatman and Noland (2013)	0.185						[redacted]		
	Ahlfeldt and Fedderson, (cited in CHSRA Economic Impact Report, 2012)			0.25	estimate for Frankfurt to Cologne			0.25		188,944
productivity	Prud'homme and Lee (1999)			0.3		employment - productivity ratio (employment/GRP assumed a proxy)	0.0000074	0.3		226,733
	Rice and Venables (2004)			0.1				0.1		75,578
permanent employment	Lynch, 2002		72		Florida HSR	n.a.	n.a.		72	57,600
	Evers (1987)		65		estimate for Amsterdam to Hamburg				65	52,301
	Preston, Larbie, and Wall (2006)			0.149	localized impact in Ashford, Kent,			0.149		112,345
					median value for accessibility elastities			0.200		151,155
					median value for jobs per corridor mile				65	52,000
										101,578

Finally, three studies directly estimated changes in employment (two of those were per high-speed rail corridor mile, and a third was an accessibility elasticity) and in this case no conversions were required. In all, eight individual studies were used.

The results of these calculations yielded a range of 2050 forecasts from a low of about 52,000 additional permanent jobs to a high of about 189,000 jobs. In fact, the results are grouped at the low end and the high end of the range, depending on whether the approach utilized jobs per corridor mile (lower impact forecasts) and accessibility elasticities (the high impact forecasts). At the high end of the range, the potential impacts would represent a significant gain in statewide employment – presently, total California employment statewide is approximately 16 million, and the CHSR service area is home to about 10.6 million jobs; by 2050, projected growth of 1.1% per year for the CHSR service area would yield a baseline employment figure of about 15.4 million in the CHSR service area; total state employment would reach about 23 million in 2050 at that same growth rate.

A mid-range forecast is proposed for EIR/EIS purposes between the median values of the two methods (i.e., the median value of estimates using the elasticity approach and the median value using the corridor distance approach). The mid-range calculation yields a gain of about 102,000 jobs over and above the baseline economic/employment forecast for the State of California by 2050. This would represent about a 0.44% gain in employment statewide in 2050, relative to 2050 employment without the project.

As noted, the wider economic effects of a major transportation investment of the magnitude of the CHSR system are extremely complex, driven by a multiplicity of factors, some known and others unanticipated, and the applicability of findings from other research to the CHSR system are at most illustrative. Accordingly, these forecasts should be understood as workable assumptions for EIR/EIS purposes.

Proposed Methodology to Apportion Long-Term Employment Impacts from Accessibility Improvements to EIR/EIS Sections

For EIR/EIS purposes, a methodology is required to apportion the estimated long-term employment gains to each of the eight EIR/EIS sections based on improved accessibility. It is recommended that the methodology be based directly on gains in accessibility for each county, using the employment forecast methodology described above.

Specifically, it is proposed that the 2050 corridor-wide increase of 102,000 jobs be allocated to individual counties based directly on the weighted shares in Table 1. That is, the measured accessibility gains can be used directly to apportion the overall corridor gain (about 102,000 jobs) to the individual counties included in Table 1. To do this, accessibility index values, defined as the product of the percentage gain for each county multiplied by the county share of the statewide total, can be calculated from Table 1. The share of increase for each county is then calculated as the accessibility score for the individual county divided by the total accessibility scores for all counties experiencing gain. These calculations are illustrated in Table 4 below. For example, Fresno County, which has the highest accessibility gain of all counties in the corridor, would receive about 26.2% of the total employment gain, or about 26,700 jobs (102,000 x .262).

The county level allocations may then be aggregated to reflect the geography of each EIR/EIS section region. However, because the EIR/EIS section regions overlap in counties where more than one EIR/EIS section is located, the sum of the EIR/EIS section regional allocations would be an over-estimate for the CHSR system as a whole.

While this approach is suitable for EIR/EIS purposes, as it uses available information, it also has limitations. In particular, it only reflects labor market accessibility gains (jobs to people and people to jobs), which is a limited perspective on accessibility. It does not take into account the relative dynamism and economic structure of individual sub-regions. For example, while the Los Angeles Basin experiences relatively small accessibility gains, its economy is complex and has high value added industry sectors that benefit in particular from enhanced linkages to other metropolitan areas of the state, and to the global economy. Therefore, the metropolitan region is probably much better positioned to benefit from the overall connectivity provided by the CHSR system. Note too that the Bay Area, the other global

metropolitan region anchoring the corridor, essentially shows no gain in accessibility using the accessibility measures available for this exercise.

Table 4 Direct Apportionment to Counties Based on Accessibility Gains

County	average accessibility increase score	% of employment gain
Fresno	0.0196	26.2%
Kern	0.0129	17.3%
Kings	0.0087	11.7%
LA Basin	0.0014	1.9%
LA North	0.0018	2.5%
Madera	0.0043	5.7%
Merced	0.0021	2.8%
Monterey	0.0024	3.3%
San Benito	0.0106	14.2%
Santa Clara	0.0058	7.7%
Santa Cruz	0.0024	3.2%
Stanislaus	0.0012	1.6%
Tulare	0.0010	1.3%
La- San Fernando	0.0003	0.4%
Orange	0.0000	0.0%
Riverside	0.0000	0.0%
Sacramento	0.0000	0.0%
San Bernardino	0.0000	0.0%
San Diego	0.0000	0.0%
San Francisco	0.0000	0.0%
San Joaquin	0.0000	0.0%
Alameda	0.0001	0.1%
San Mateo	0.0001	0.2%
All other counties	0.0000	0.0%
sum of scores	0.0748	100.0%

The limitations of the analysis, as described above, should be duly noted in the EIR/EIS documentation.

Long-Term Population Impacts

While the information requested as part of this analysis did not focus on effects on population (versus employment), it is reasonable to assume employment gains would result in some degree of residential shifting in response to changes in basis sector employment, as well as potential increases in the labor force. These impacts are complex, and often addressed through land use – transportation modeling systems of varying sophistication. Such an analysis is far beyond the scope of this assessment.

Even without such modeling, the impacts of permanent employment gains (about 102,000 statewide, but not considering the demographic and labor force impacts of construction itself) on the size and

distribution of California's population would be a function of a number of factors; for example, some people would move about from one county or area in the state to another, filling employment gaps in a high demand location. The extent of this movement would depend on differentials in housing costs and supply, as well as labor market conditions in each area. Moreover, in some areas where employment would see an increase, labor markets may be sufficiently slack to absorb new employment opportunities by drawing more resident people into the active labor force.

To complete the requirements of EIR/EIS analysis for secondary and induced impacts, a simple approach to estimating potential demographic changes associated with the long-term employment gains would be to assume a constant population-to-employment ratio based on the demographic data available. In Table 2, a constant statewide employment-to-population ratio of 2.257 was calculated. Applying this ratio would estimate the average population impacts in a given EIR/EIS region. Specifically, the allocated gains in employment for each EIR/EIS region could be multiplied by 2.257 to arrive at the increase in population. For Fresno County, for example, the gain in population could be estimated as the allocated 26,700 employment increase multiplied by 2.257, or a population gain of about 60,320 persons (household increase would be smaller, based on average household size). However, this approach does not account for varying regional family sizes or number of workers per household. As such, the recommended approach is to calculate the population-to-employment ratio for the specific EIR/EIS section region and use the ratio to estimate increases in population. Similarly, average household size used to calculate increases in regional households should use the average household size calculated for the EIR/EIS section multi-county region.

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APPENDIX G:
FRA MEMO ON DOCUMENTING NEPA CONCLUSIONS

U.S. Department
of Transportation
Federal Railroad Administration

Date: April 6, 2017

To: Mark McLoughlin and Lisa Nungesser (California High-Speed Rail Authority)

From: Marlys Osterhues (Federal Railroad Administration)

Project Title:
California High-Speed Train (HST) Program

Award Number:
FR-HSR-0009-10-01-05

The California high-speed rail (HSR) program is subject to federal and state environmental review requirements; therefore, project environmental documentation will be prepared in compliance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The purpose of this memo is for the Federal Railroad Administration (FRA) to explain the important difference between NEPA and CEQA with respect to the categorization of impacts as significant or not significant and direct the California HSR Authority to eliminate references to NEPA significance in all ongoing and future environmental reviews.

Under NEPA, if a federal agency determines its proposed federal action, when considered as a whole, has the potential to "significantly affect the quality of the human environment," it must prepare an EIS. 42 U.S.C 4332. Under the Council on Environmental Quality's (CEQ) regulations implementing NEPA, significance is determined based on an evaluation of an impact's context and intensity. See 40 CFR §1508.27. Once an agency has determined an EIS is required because a project has the potential for significant impacts, the EIS must evaluate the significance of the project's impacts but is not required to conclude whether a specific impact itself is significant. See 40 CFR §1502.16. This approach is different from what might be required by CEQA, which includes mandatory findings of significance. The CEQA counterpart to the NEPA EIS, an Environmental Impact Report (EIR), has additional requirements beyond NEPA and employs a threshold-based approach first identifying each "significant effect" to a given environmental resource and then applying mitigation to each "significant effect" with the objective of reducing the level of significance.

In order to satisfy the requirements of NEPA and the CEQ regulations, the NEPA analysis in ongoing and future project-level EIR/EISs for the independent sections of California HSR should focus on the magnitude of the impact, or put another way, the impact's context and intensity. The severity of the impact must be examined in terms of the type, quality, and sensitivity of the resource involved, location and extent of the effect, duration of the effect (short- or long- term), and other considerations set forth in the CEQ regulation. The Environmental Consequences section should include a comparative analysis of the alternatives considered, including the No Project Alternative, based on sound technical information. Because NEPA considers the impact from the project as a whole, individual CEQA significance determinations cannot be used as a surrogate for the discussion of significance under NEPA; they are threshold-based analyses provided to satisfy CEQA and should be differentiated as such in the joint EIR/EIS.

In addition, all ongoing and future project-level EISs for the independent sections of California HSR should omit conclusions on whether, individual impacts are significant under NEPA. As noted

above, conclusions regarding NEPA significance are not required by NEPA or the CEQ regulations, and do not better inform the public or decision-makers about the nature and severity of the impacts of the project. References to "significance" should be limited to only that text describing the methodology and significance determinations under CEQA. All other references to significance should be eliminated. This direction amends the previous approach and methodology for resource sections only with regard to references to significance under NEPA. FRA's expectations with regard to the analysis of impacts under NEPA has not changed.

FRA's expectations for the documentation of joint NEPA/CEQA documents is consistent with the direction FRA is moving on a National policy level and aligns with guidance in Caltrans' Environmental Handbook[i] NEPA impact evaluation text should not include determinations of significance. As Chapter 37 of the Caltrans Environmental Handbook explains:

> One of the primary differences between NEPA and CEQA is the way significance is determined and later discussed in environmental documents. Under NEPA, significance is used to determine whether an EIS, or some lower level of documentation, will be required. NEPA requires that an EIS is prepared when the proposed federal action (project) as a, whole has the potential to "significantly affect the quality of the human environment." The determination of significance is based on context and intensity [...]. Some impacts determined to be significant under CEQA may not be of sufficient magnitude to be determined significant under NEPA. Under NEPA, once a decision to do an EIS is made, it is the magnitude of the impact that is evaluated and no judgment of its significance is deemed important for the text. NEPA does not require that a determination of significant impacts be stated in the environmental documents.
>
> CEQA, on the other hand, does require the Department to identify each "significant effect on the environment" resulting from the project and ways to mitigate each significant effect. A significant effect on any environmental resource triggers the preparation of an EIR. Each and every significant effect on the environment must be disclosed in the EIR and mitigated, if feasible. In addition, the CEQA Guidelines list a number of mandatory findings of significance, which also require the preparation of an EIR. There are no types of actions under NEPA that parallel the findings of mandatory significance in CEQA.

This excerpt from the Environmental Handbook identifies a related issue of how and when mitigation measures are appropriately applied in the impact evaluation process. Under NEPA, the comparative analysis of each alternative should include a discussion of measures to mitigate adverse environmental impacts. 40 CFR 1502.16. This provides the decision maker with a full picture of the potential impacts to a given resource. However, under CEQA, mitigation is only applied if, based on specified significance thresholds, an impact is determined "significant." This distinction is important because, under NEPA, the determination that an impact is "significant" does not influence whether an EIS addresses mitigation. As described in CEQ's Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, "[o]nce the

proposal itself is considered as a whole to have significant effects, all of its specific effects on the environment (whether or not "significant") must be considered, and mitigation measures must be developed when it is feasible to do so." 46 FR 108026 (March 23, 1981). Therefore, for all ongoing and future project-level EIR/EISs, the NEPA impact evaluation should identify and discuss measures to mitigate adverse impacts and should be clearly distinguished from the threshold-based CEQA approach to determining potential significance.

FRA has provided comments through the review process of recent EIR/EIS documents to clarify these NEPA/CEQA distinctions. Additional guidance may be provided upon request.

[i] Caltrans Standard Environmental Reference (SER) website: Environmental Handbook, Volume 1, General Guidance for Compliance, Chapter 37 -Preparing Joint NEPNCEQA Documentation. (Last content update: 08/26/2014, JH)

VOLUME 2 TECHNICAL APPENDICES

The analytical conclusions presented in Chapters 2 through 5 are based on substantial evidence, which is supported by detail contained within Volume 2, Technical Appendices. Volume 2 of the California high-speed rail (HSR) project-level environmental impact report/environmental impact statement (EIR/EIS) is intended to:

- Help the public and agencies review the EIR/EIS and better understand topics addressed in the environmental document
- Reduce the bulk and complexity of Volume 1, thereby improving readability and usefulness of the overall EIR/EIS

Information included in the technical appendices provides calculations, findings, and other information that does not merit a full technical report, but is relevant and supports the conclusions within the EIR/EIS. In general, summarize the results of technical studies in Volume 1 and report the detailed information in Volume 2 technical appendices. Information to support the technical analysis and conclusions contained in the EIR/EIS must be determined for each HSR section in consideration of geographic, natural resource, and community characteristics, proposed HSR improvements, and the detailed analyses that are warranted to fully evaluate environmental impacts. Consult with the California High-Speed Rail Authority (Authority) and the Federal Railroad Administration (FRA) to determine the appropriate technical documentation before preparing the Administrative Draft EIR/EIS. See the EIS/EIR Volume 2 Technical Appendices prepared for the Merced to Fresno and Fresno to Bakersfield HSR Sections for examples of information content, level of detail, and organization.

Outline for Volume 2 Appendices

This outline anticipates the appendices that will be common to all HSR sections. Determine the actual Volume 2 content based on the specific technical information in the EIR/EIS for the HSR section or project, with the concurrence of the Authority and FRA. To aid the reader, the order of technical appendices in Volume 2 should be based on the sequential order of topics in Volume 1. For example, the technical appendix associated with information contained in Chapter 1, Purpose and Need, would be Appendix 1-A. For multiple appendices for a specific chapter or section, letters in alphabetical order should follow the number. Titles for each appendix should indicate the information contained in the text.

1-A Business Plan (summary and brief explanation of relationship between the EIR/EIS and Business Plan (including website reference)
2-A Road Crossings
2-B Railroad Crossings
2-C Operations and Service Plan Summary
2-D Applicable Design Standards
2-E Project Impact Avoidance and Minimization Features Analysis
2-F Traction Power Facilities
2-G Maintenance Plan (technical memorandum) or Summary of Requirements for Operations and Maintenance Facilities (see *Fresno to Bakersfield Section Final EIR/EIS* Appendix 2-E)
2-H Emergency and Safety Plans
3.1-A Parcels within HSR Footprint (bound separately)
3.1-B Regional and Local Policy Inventory
3.3-A Air Quality and Global Climate Change
3.3-B Potential Impact from Induced Winds (memo from *Merced to Fresno Section Final EIR/EIS*)
3.4-A Noise and Vibration Analysis

3.4-B Noise and Vibration Mitigation Guidelines (memo from *Merced to Fresno Section Final EIR/EIS*)
3.5-A Technical Study: Pre-construction Electromagnetic Measurement Survey
3.6-A Existing Plus Project Conditions Energy Analysis
3.6-B Water Usage Analysis Technical Memorandum
3.6-C Energy Analysis Memorandum
3.7-A Special-Status Species and Observed Habitats
3.7-B Comparison of Impacts on Biological Resources by Alternative
3.8-A Water Bodies Crossed by HSR Section Alternatives
3.8-B Floodplain Risk Assessment
3.8-C Basin Plan Water Quality Impact Assessment
3.10-A Potential Impacts on Schools from Hazardous Materials
3.10-B Hazardous Materials and Wastes (unless documented in a standalone technical report)
3.11-A Safety and Security Data
3.11-B Airport Obstructions (if applicable)
3.12-A Relocation Assistance Brochures
3.12-B Effects on School District Funding and Transportation Bus Routes
3.12-C Draft Relocation Impact Report (Preliminary Right-of-Way Acquisition and Relocation Plan)
3.12-C Children's Health and Safety Risk Assessment
3.12-D Summary of Issues/Concerns Affecting Schools (Final EIR/EIS only)
3.13-A Land Use Plans, Goals, and Policies
3.14-A Results and Findings of Land Evaluation and Site Assessment Pursuant to Farmland Preservation Policy Act
3.14-B Effects on Confined Animal Agriculture (if applicable)
3.14-C Williamson Act, Farmland Security Zone, Timberland Protection Zone Compliance Data (if applicable)
3.17-A Section 106 Programmatic Agreement
3.18-A RIMS II Modeling Details
3.19-A Planned and Potential Projects and Plans
3.19-B Planned and Potential Transportation Projects
5-A Environmental Justice Engagement Report
6-A Operating Cost Memorandum